THE IRON TRADE REVIEW

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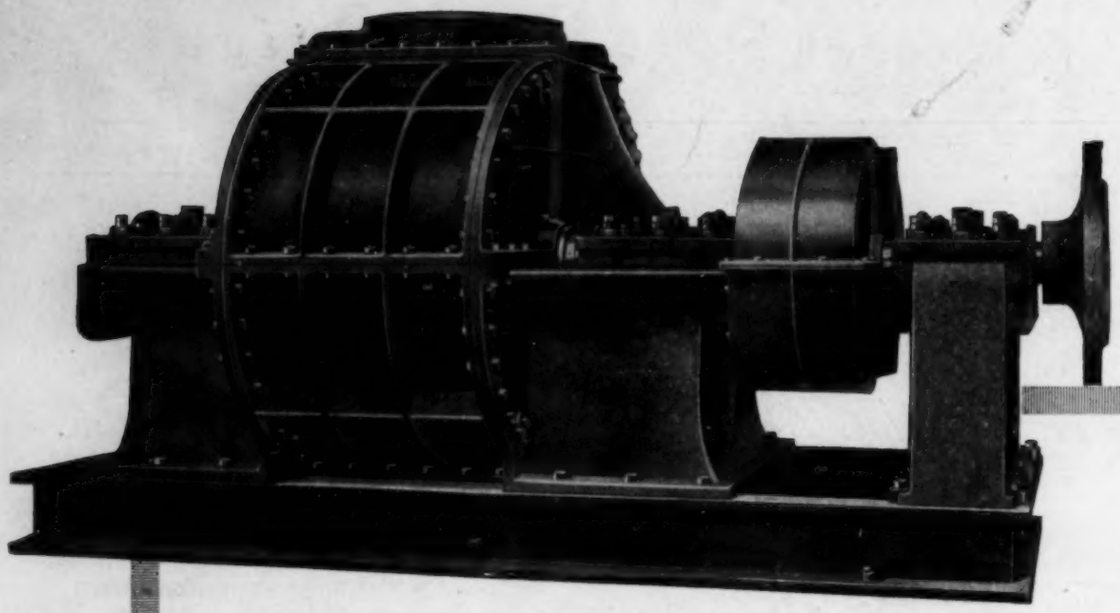

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NEW YORK
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THE IRON TRADE REVIEW

Vol. LXII Cleveland, April 18, 1918 *No. 16*

Tighten Rein on Steel Consumption

Leading Mills Adopt Stringent Policies of Distribution to Concentrate on Absolute War Requirements—100 Per Cent Output Being Supplied in Some Cases—Enormous Military Needs Continue to be Shown

SHARP concentration of production upon immediate war demands to the exclusion of all other business, is the prompt response of the mills to the more clearly defined magnitude of the government's requirements in iron and steel. New policies put in effect this week by the leading producers in the Pittsburgh district and elsewhere represent actually the setting aside of all private obligations, temporarily at least. The largest of these interests now has closed its rolling schedules to everything but Class A tonnage. Even indirect war needs are being disregarded. Another large independent company formally has denied itself to open market inquiries and has notified the trade that promises of delivery hereafter are not to be expected. In this turn of affairs is to be seen the most rigid barrier to nonwar consumption that yet has been raised. In the east the government has been insisting that practically 100 per cent of production shall be applied to its requirements and severe rebukes have been administered to mills which have shipped even small tonnages elsewhere.

War Needs Still Grow

Why such sweeping measures are being brought to bear continues to be drawn from the freshly presented details of the government needs. The mills are being squared away to supply the enormous quantity of shell steel wanted for this year which, as stated last week, is estimated to exceed 4,000,000 tons. The statement of the steel director to the senate committee on commerce shows that in plates alone there is now on order for the government and its allies a total of 2,374,711 tons. Much more tonnage for ships to be built this year is in sight, as it is figured it will require approximately 175,000 tons monthly to take care of a shipbuilding output of 500,000 tons deadweight. Makers feel that notwithstanding the tremendous plate requirements, capacity will be adequate, but the steel director has questioned whether sufficient rolling capacity now is being devoted to this product.

The steel director has made clear that much of the heavy tonnage of plates and other forms which the mills have been asked to rush to England is to replace 750,000 tons previously borrowed by General Pershing for American overseas requirements. Obviously this process of substitution was adopted to save valuable time and shipping space. It offers an interesting commentary on the large capacity of the British industry for meeting war demands.

Apprehensive at Delays

As the government delays action on its car and locomotive orders, some apprehension is being expressed that this equipment may not be completed in time to serve as a safeguard against recurring freight congestion next winter. Some charges have been made that the government is delaying action needlessly in endeavoring to strike a closer bargain with the builders. The question of available steel supply in the end apparently is to determine the manner in which the order is to be executed. If it is decided the shipping program must have the first claim on steel, the number of cars is likely to be reduced and wooden types largely adopted. The importance of the matter from the standpoint of material, may be measured from the 575,000 tons of plates which will be needed for the government equipment plan, as originally laid out.

The proposed plan of making pig iron allocation through formal government requisition instead of by mere request is to be followed. It is felt the furnaces must have such a safeguard against the possibility of civil action by consumers whose purchases are being conscripted. The week's story of the market is a repetition of the futile efforts of consumers to buy iron. The best furnaces will do in the east is to make indefinite reservations. Furnace operations continue to improve under better coke supply, due to more adequate car service. The opening of lake navigation, however, again directs attention to the probable needs of car supply for the coal movement to the northwest. The upper lake district is calling for 27,000,000 tons of coal, or 1,000,000 tons weekly.

The Iron Trade Review

EDITORIAL

Business Back of the War

BUSINESS men have found lack of efficiency in government circles as regards the war. Business men have supplied the solution of the difficulty. It has been to enlist business men as actual buyers of materials and as directors of activities of manufacturing in behalf of the government. It has been to bring to the problems of the government the experience and knowledge of large affairs which those already in office do not possess, because they have not needed to be so equipped in times of peace when quantity and speed were not essential.

Discussions at the recent gathering of the Chamber of Commerce of the United States in Chicago bristled with patriotism and full realization of the urgent necessities facing this government; with the desire to put a shoulder to the wheel and to push hard and effectively. A sudden awakening on the part of the nation as a whole is giving force to the ideas that have been held and advocated for months by far-sighted leaders of business who have seen the needs and have urged measures to meet the situation.

Much information of a reassuring nature was presented, constructive criticism and valuable suggestions came from the various papers and the pervading spirit was of the greatest helpfulness. No more patriotic gathering has been assembled in years and the advice developed will go far toward aiding the government in its efforts. The best and highest trained business brains of the country are needed for prosecuting the greatest business the country ever has engaged in—the business of war for the preservation of liberty. And business is proving that it stands ready to supply a 100 per cent service.

Tin Shortage at Serious Stage

STEPS now being taken by the government to conserve supplies of pig tin emphasize the seriousness of the tin situation. Manufacturers of solder, white metals and bearing metal were summoned by the raw tin division of the war industries board to Washington this week to discuss tin conservation. In March, the war trade board imposed an embargo on exports of tin plate and other articles containing tin, except where destined to be of direct assistance to the allies. The mobilization of our army and the maintenance of our expeditionary forces are increasing the need for tin plate for food containers and other purposes to an extent not generally appreciated, while other classes of war work are increasing their requirements. Nearly all our supplies of pig tin must be brought from the East Indies, which means a long ocean voyage, involving both time and vessel tonnage.

The following table shows the imports of tin in gross tons into the United States during the past few years, the approximate consumption of tin in tin plate manufacture, the ratio of such consumption to tin imports, and the exports of tin contained in tin plate:

	Pig Tin Imports.	†Tin used for tin plate.	Percentage tin imports thus used.	Exports of tin in tin plate.
1918.....	‡51,312	*33,000	*64	††
1917.....	64,146	*30,000	*47	4400
1916.....	61,636	24,700	40	4548
1915.....	51,623	21,118	41	3092
1914.....	42,433	18,624	44	1191
1913.....	46,554	16,474	31	1056
1912.....	51,787	19,259	37	1633

‡On the basis of first quarter imports of 12,828 gross tons.
†On the basis of 2 pounds of tin per 100 pounds of tin plate.
*Estimated.
††Embargo imposed by war trade board effective March 8, 1918.

Necessarily, some of the figures in the above table for 1917 and 1918 are estimates, but they clearly show the tendency. Either imports of tin must be largely increased during the remainder of the current year or consumption materially reduced. That the government is undertaking to increase supplies is indicated by recent reports that it has been a large buyer of Straits tin in the primary market at Singapore. That it is endeavoring to curtail consumption is shown by the current meetings of consumers in Washington. Stocks of the white metal in the United States had dwindled to 134 tons on April 1, as compared with a daily consumption of about 174 tons, and as against stocks in other years of from 3000 to 4000 tons. Such spot tin as can be picked up is selling at about 90 cents a pound and up, as compared with 51½ cents a pound a year ago. Imports of tin in 1918 undoubtedly will be increased to a volume considerably above the indicated figure of 51,312 gross tons which is based on first quarter imports. Accordingly, the percentage of tin supplies consumed in the tin plate industry will be reduced considerably below 64 per cent. But immediate and effective

action is imperative if essential industry is not to be handicapped by a shortage or a famine of tin.

Helping the Foreign Born

HOW to get in close touch with the foreign-born workman is one of the greatest of all labor problems today. There is one method which has met with marked success which involves no complex organization or expenditure of money. It is the teaching of the English language. The foreigner comes to this country expecting to work. He wants to work, but his ignorance of the language greatly handicaps him.

At various iron and steel plants in this country the teaching of English to the foreign employes is being attempted on a large scale. The work has passed the experimental stage. The experience of several years has helped to put such work on a practical basis and to reduce the plans and methods to a system which shows wonderful returns. The welfare department at one plant has set aside a room in the recreation building where classes in English are held twice a week in the evenings for the foreign employes. If the employe is on night duty at the plant, he is relieved by another workman and permitted to attend the class. The course consists of 30 lessons. These are printed in leaflet form and are designed to give foreigners a knowledge of English for daily use in the home, in work and in business. Ten are known as the domestic series and include words and phrases which pertain to the home.

The second series of lessons deals with experiences which are common in the plant and are appropriated for all groups of works in the blast furnace, coke oven, bessemer, open-hearth and rolling mill departments. These lessons include tapping the furnace, opening the cinder notch, patching converter bottoms, and the names of the various tools and appliances used in the departments.

Those who have been putting the plan into practice with success assert that when the lessons have been mastered, the foreigner will have a good vocabulary of simple words and phrases which are descriptive of his daily vocation. His work will also show a marked improvement. He will be able to read intelligently, to speak fluently and to write accurately. When this is done he can more readily absorb the ideals of America and be a real citizen.

We Shall Use Our Waterways

AFTER 50 years of log rolling and pork barrel appropriations the United States at last is to have a comprehensive, constructive policy governing the development of its internal waterways. At least such will be the case if plans now well under way are matured along the lines already laid down. Under the pressure of war necessity, which demands an efficient, smooth-working transportation system extending all the way from the interior of the country to the front line trenches in France, the shipping board and railroad administration have joined hands to bring about the actual use of our waterways. Heretofore we have spent millions for so-called waterway development without increasing the freight carrying capacity of the country's transportation system to any measurable degree. Now it appears we are to have results. Traffic will begin to move by water.

The shipping board, through the Emergency Fleet corporation, has appropriated $3,360,000 for the construction of towboats and barges. Contracts for twenty-four 2500-ton steel barges and four powerful towboats for Mississippi river service are to be let at once. Other plans are maturing for a fleet of barges for the New York barge canal which will be finished through from Buffalo to Albany this year. A committee of practical transportation experts, including such men as G. A. Tomlinson of Duluth, has been appointed by the railroad administration to work out a comprehensive plan and to see to it that the freight moves.

The importance of these developments to the iron and steel industry is almost self-evident. Already on the Great Lakes, the iron and steel interests are the largest users of water transportation in the country. Also on the Mississippi and other connecting rivers such companies as the Mississippi Valley Iron Co., St. Louis, and the Keystone Steel & Wire Co., Peoria, Ill., have conducted extensive experiments on handling pig iron, iron ore and coal by water.

Heavy bulk products, such as the raw materials used in the iron and steel industry, it has been thoroughly demonstrated can be moved with maximum economy and dispatch by water, provided adequate, modern equipment and terminal facilities are available. The facilities are being provided and as they are brought into use the strain on the railroads will be lessened. In this new departure in American freight traffic experience, the iron, steel and allied industries through experience will assume a prominent position.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 1020

PIG IRON

Bessemer, valley	$35.20
Bessemer, Pittsburgh	36.15
Basic, Pittsburgh	32.95
Basic, eastern Pa.	32.00
Basic, Buffalo	32.00
Malleable, Pittsburgh	34.45
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern), $33 furnace base.

2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern), base plus 50c.

2.75 to 3.25 silicon (No. 1X, No. 2, soft), base plus $1.50.

Over 3.25 silicon, $34.50, plus $1.00 for each ½ per cent of silicos.

No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	33.95
No. 2 foundry, Cleveland	33.95
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2X foundry N. J. tide	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Gray forge, Pittsburgh	32.95
Silveries, 8 per cent, furnace	46.00
Silveries, 8 per cent, Chicago	48.54
Low phos. standard, Phila.	55.00 to 56.00
Low phos., Lebanon furnace	50.00
Low phos., Pittsburgh	53.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	39.75
Charcoal, southern furnace	43.00

COKE

(At the ovens)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Pocahontas furnace	8.00
Pocahontas foundry	8.00
New River foundry	8.00
New River furnace	7.00
Wise county furnace	6.00
Wise county foundry	7.00

FERROALLOYS

Ferromanganese, 80 per cent delivered	$275.00
Ferromanganese, 70 per cent delivered	250.00
Spiegel, 16 per cent fur.	70.00
Spiegel, contracts, furnace.	70.00
Ferrocarbon titanium, carloads, maker's plant	200.00
Ferrosilicon, 50 per cent, second quarter, Pitts.	170.00 to 185.00
Ferrosilicon, 50 per cent, Pitts., remainder of 1918	155.00
Bessemer ferrosilicon, 9 per cent.	$54.00
Bessemer, ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O.

SEMIFINISHED MATERIAL

BILLETS

Open-hearth, Pittsburgh	$47.50
Open-hearth, Philadelphia	50.50
Open-hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forging, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open-hearth, Pittsburgh	$51.00
Open-hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pitts.	2.90c
Sheared skelp, Pitts.	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chgo.	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel, Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Phila.	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base.	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$55.00
Stand. open-hearth rails, mill	57.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	60.00 to 67.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	5.115c
Tie plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pbgh.	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ¾ in. proof coil, Pitts.	8.00c
Sheet piling, base, Pitts.	4.00c to 5.00c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

(In cents per pound)

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open-hearth, Chi.	5.215c

TIN MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open-hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open-hearth, Chi.	6.465c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open-hearth, Chi.	4.465c
No. 10, open-hearth, Phila.	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base Pittsburgh	Black Per cent off	Galv. Per cent off
¼ to 3 in., butt, steel	51	37½
¾ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	30
Iron, 3½ to 4½ inches, c. l.	12½

CAST IRON WATER PIPE

(Class B Pipe)

Four-inch, Chicago	$7.30
Six-inch and over, Chicago	54.30
Four-inch, New York	58.35
Six-inch and over, N. Y.	55.35
Four-inch, Birmingham	$2.00
Six-in. and over, Birmingham	49.00

HOOPS, BANDS, SHAFTING

Class A pipe is $1 higher than Class B.

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	2.90c
Shafting, Pitts., carloads	17 off to list
Cotton ties, April, per bundle	$1.90

RIVETS

Structural rivets, Pittsburgh.	4.65c
Boiler rivets, Pittsburgh	4.75c
Rivets ⅞ in. and smaller, Pitts.	45 and 10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semi finished hexagon nuts ¾ in. and larger	60–10–10 off
Cold pressed semi finished hexagon nuts ⅞ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago)

Quotation on leading products April 17, average for March, 1918, average for January, 1918, and average for April, 1917. Prices are those ruling in the largest percentage of sales at the dates named

	Prices April 17, 1918	Average prices March, 1918	Jan., 1918	April, 1917
Bessemer pig iron, Pittsburgh	$36.15	$37.25	$37.25	$42.20
Basic pig iron, Pittsburgh	32.95	33.95	33.95	39.20
*No. 2 Foundry pig iron, Pitts.	33.95	33.95	33.95	39.95
*No. 2, Foundry pig iron, Chi.	33.00	33.00	33.00	39.25
Lake Superior charcoal, Chicago	37.50	37.50	37.50	42.25
Malleable, valley	33.50	33.50	33.50	36.00
Malleable, Chicago	33.50	33.50	33.50	39.00
**Southern, No. 2, Birmingham.	33.50	33.50	33.50	35.79
*Southern Ohio No. 2, Ironton	33.00	33.00	33.00	38.60
Basic, eastern Pa.	32.00	33.00	33.00	38.25
**No. 2X Virginia, furnace	33.50	33.50	33.50	38.25
**No. 2X foundry, Philadelphia	34.25	34.25	34.25	41.50
Ferromanganese, 70%, delivered.	250.00	250.00	250.00	360.00
Bessemer billets, Pittsburgh	47.50	47.50	47.50	72.50
Bessemer sheet bars, Pittsburgh	51.00	51.00	51.00	72.50
Open-hearth sheet bars, Pitts.	51.00	51.00	51.00	72.50
Open-hearth billets, Pitts	47.50	47.50	47.50	72.50
Steel bars, Pittsburgh	2.90	2.90	2.90	3.38
Steel bars, Chicago	2.90	2.90	2.90	3.54
Iron bars, Philadelphia	3.50	3.50	3.648	3.659

*5 to 2.25 silicon. **2.25 to 2.75 silicon.

	Prices April 17, 1918	Average prices March, 1918	Jan., 1918	April, 1917
Iron bars, Cleveland	$3.64	3.64	3.64	3.25
Iron bars, Chicago mill	3.50	$3.50	$3.50	$3.19
Beams, Chicago	3.00	3.00	3.00	3.79
Beams, Pittsburgh	3.00	3.00	3.00	3.70
Beams, Philadelphia	3.185	3.185	3.185	4.159
Tank plates, Pittsburgh	3.25	3.25	3.25	4.50
Tank plates, Chicago	3.25	3.25	3.25	4.69
Tank plates, Philadelphia	3.435	3.435	3.435	6.909
Sheets, blk., No. 28, Pitts	5.00	5.00	5.00	5.75
Sheets, blue anld., No. 10, Pitts.	4.25	4.25	4.25	3.75
Sheets, galv., No. 28, Pitts	6.25	6.25	6.25	3.75
Wire nails, Pittsburgh	3.50	3.50	3.50	3.20
Connellsville furnace coke	6.00	6.00	6.00	7.25
Connellsville foundry coke	7.00	7.00	7.00	7.87
Heavy melting steel, Pitts	29.00	30.00	30.00	28.12
Heavy melting steel, eastern Pa.	28.00	29.50	29.80	25.15
Heavy melting steel, Chicago	29.00	30.00	29.70	26.63
No. 1 wrought, eastern Pa.	34.00	35.00	35.00	38.50
No. 1 wrought, Chicago	33.50	35.00	35.00	33.30
Rerolling rails, Chicago	34.00	35.00	35.30	31.90

(For Additional Prices See Page 1020)

Iron Shortage Remains Unrelieved

Consumers Still Search Market for Metal With Small Results—Eastern Makers Accepting Only Reservations—Allocation Method Revised—Some Minor Modification of Differentials May Be Recommended

Chicago, April 16.—Inquiry for pig iron is being received by local makers in large tonnage, one interest this morning receiving in excess of 10,000 tons which had not appeared on the market previously. An East St. Louis interest which has been seeking basic iron for some time and has managed to cover partially, is still inquiring for 10,000 tons of that grade. In fact, almost all the large basic users in that section are seeking additional tonnage. Malleable iron is also in heavy demand and any analysis that resembles malleable and can be worked into the mixture is sure of ready sale if offered. Foundry iron is also in demand but not quite to the extent as other grades. Occasional offerings by furnaces at a distance through local brokers are taken up as soon as offered. High silicon iron is scarce and silveries are practically unobtainable, though Jackson county makers who have been busy on bessemer ferrosilicon have turned to silveries again to fill former contracts. Lake Superior charcoal iron is well sold for the remainder of the year and it is practically impossible to place more tonnage of that grade. Just what the outcome of the present shortage will be is not clear. That some users will be short before the close of the year is the only conclusion possible at present. However, every effort is being made to avoid as far as possible the effects of such a condition.

Parcel Out Small Lots

Boston, April 15.—A large electrical company is in the market for 4400 tons of high silicon iron for its three New England plants for fourth quarter delivery. A northern furnace has authorized its local agents to book 600 tons for May and June delivery which has been parcelled out in lots of one and two cars to those customers of the seller that stand badly in need of nearby iron. These are the outstanding features of an otherwise quiet and uninteresting week in the local market. Deliveries are fairly good from all points of production, but they are confined largely to those plants engaged on Emergency Fleet corporation work or to concerns which can accept deliveries to a government official. Inquiries are fewer rather than more numerous than they have been, for melters realize the futility of trying to secure something that is not available. Most of the furnaces represented in this territory have not a pound of iron to sell for prompt delivery, and there are not a few who have no iron for sale for the year. No complaint is heard about the delivery of Alabama iron but those who handle this product feel that larger shipments could be made in view of the report that boats bringing cotton north are coming in with water for ballast. An effort is being made to get the southern steamship lines to substitute iron for the water. Shipments of Connellsville coke into this territory are practically negligible and New England wants continue to be supplied largely by the local makers.

Tonnages Are Reserved

New York, April 15.—Reservation of tonnages by furnace representatives for regular customers now constitutes the principal activity in the pig iron market in this district. Furnaces generally are unwilling at this time to take on any

additional forward commitments for various reasons, such as the uncertainty of their future coke supply and a desire to work off some of the large orders on their books before undertaking new ones. The tonnages now being reserved probably will be accepted later by the furnaces in accordance with their ability to handle them. Practically the only second half iron sold during the past week, was southern foundry, of which several thousand tons went to consumers in this district. As a result of the situation described, the volume of inquiry is more restricted. The largest requirements now open are those of the General Electric Co. for 10,000 to 11,000 tons of foundry and malleable, of the New York Airbrake Co. for 10,000 to 20,000 tons of foundry, of the American Locomotive Co. for considerable basic and foundry, of the J. L. Mott Co., Trenton, N. J., for several thousand tons of foundry, for second, third and fourth quarters, of the Essex Foundry, Newark, N. J., for 4000 tons of foundry, etc. The Pennsylvania railroad's second half inquiry has not yet been closed. The shortage of malleable iron is most acute, and the Eastern Malleable Iron Co., the Crane Co., and other users, eagerly are snapping up carloads which occasionally are offered by furnaces producing the grade incidentally. Occasional sales of off iron continue to be made for prompt shipment but they involve very little tonnage in the aggregate. Sales are reported here of several hundred tons of southern foundry for shipment to the Pacific coast for export to the Orient.

Some Sizable Sales Made

Philadelphia, April 16.—A fair number of important sales of pig iron was made in this district during the past week, but generally inquiries far exceed the ability or the willingness of the furnaces to sell. The Lukens Steel Co. placed 15,000 to 16,000 tons of second quarter basic with Schuylkill valley furnaces. Several thousand tons of copper low phosphorus iron for second quarter and second half also were sold. Other sales involve a small tonnage of prompt foundry and off irons. Practically the only activity for the second half is represented by reservations which some furnaces now are making. New inquiries are numerous. The General Electric inquiry reported last week has been increased and now calls for 15,000 to 20,000 tons of various grades, principally for last quarter. The Niles-Bement-Pond Co. has asked for 2500 tons of foundry iron. The Bethlehem Shipbuilding Corp. wants 1500 tons of foundry iron for immediate shipment at Elizabethport, N. J., and San Francisco. The eastern Pennsylvania steelmaker who is behind on its deliveries of merchant iron has put one steelmaking furnace on foundry pig iron temporarily to help out. Several furnaces continue to suffer from lack of coke.

Good Inquiry, Little Iron

Buffalo, April 16.—There have been several sizable inquiries of about 1000 tons before the Buffalo market but the greater portion of the demand is for smaller lots. One of the features of the market is the demand for carload lots or thereabouts sent in by users who have been given extra government orders and must have small additional tonnages. The amount of placement is exceedingly small though local interests take up the inquiries with every furnace connection they have. Negotiations are opened as far west as St. Louis, throughout eastern Pennsylvania and as far south as Birmingham in an effort to assuage the demand in some small way, but little success is reported. It is very difficult at this time to place a pound of iron with Buffalo makers. Every effort now is made by makers to ship against former bookings, but there is not a furnace in the district that is not behind in its deliveries. Furnacemen appear to think that users will get along fairly well this summer, but that a poignant shortage will make itself felt some time next winter. Most of the furnaces are short of coke which militates against free bookings, and the root of this evil appears to be shortage of cars. The same difficulty hampers the shipments of iron.

Change Allocation Method

Cleveland, April 16.—Modification of the method of allocating pig iron by the committee on pig iron, ore and lake transportation has been adopted along the lines reported last week as being under advisement. Under this plan, the committee will continue to make the allocations, but it will be required that the particular department of the government in whose behalf the iron is to be used shall furnish the furnace a formal order or some form of communication. This is to protect the producer against the liability of civil action for violation of contract by some customer whose position on the order book had been displaced. Allocations have reached the point, as previously explained, where they represent the commandeering of tonnage already sold. One producer declined to accept an order without formal requisition to make a test case. A new government lot of 200 tons of foundry iron for Allentown, Pa., has been sought. Part of the 1000-ton low phosphorus inquiry for the Watertown, N. Y., arsenal has been placed. An allocation of 875 tons of foundry and high silicon for Kalamazoo, Mich., has been held up temporarily. Open inquiry from general buyers continues active. Sales are almost entirely lacking. A local producer continues to take some last half foundry business from regular customers. The General Electric Co. wants about 10,000 tons of foundry, malleable and bessemer for Erie, Pa. for fourth quarter in addition to approximately an equal amount for eastern plants. Normal furnace operations have about been restored in this and nearby districts. The railroads are beginning to bring out new tariffs for a 15 per cent increase on pig iron as per recent government authorization. These are going into effect five days after issuance. The new rate from Cleveland to Detroit, for instance, now in use, is 90 cents against 79 cents formerly.

Basic Supply Wanting

Cincinnati, April 15.—All embargoes against the shipment of southern iron to northern consuming points have been lifted. This action has facilitated the movement of iron from that section in a marked degree. Complaint is made that cars are scarce, as a large number were recently sent to railroad lines in the northwest. Motive power is also lacking and when cars are loaded there is considerable delay in getting them to destinations. A great deal of gossip has gone the rounds that basic iron is practically unobtainable. These rumors have practically been confirmed, and with the exception of small tonnages in the south, reliable authorities state that they do not know where steelmakers can turn for an adequate supply for this year. The foundry iron situation is not quite as bad, as many furnaces in the Birmingham district have held back disposing of their entire tonnage for the last half, and these will have some metal to offer before the beginning of the third quarter. Reliable reports from the Virginia district are not encouraging, and melters cannot rely upon furnaces there to relieve the shortage. In southern Ohio there will be some foundry iron for sale later, and probably a very little basic and malleable, but this is not yet on the market.

Available Metal Very Scant

St. Louis, April 13.—The demand for pig iron shows no signs of easing down and available material this week has been the lightest since the present scarcity commenced. Agents and

dealers report a scattering inquiry for small tonnages, most of them of an urgent character, in addition to the great unsatisfied demand which has underlaid the market for more than a month past. Larger consumers are pressing for deliveries, which have been rather unsatisfactory. This is true of iron from all directions. The south, which had been holding its own fairly well up to about April 1, has fallen back. One large user in this district purchased 3000 and 3500 tons for fourth quarter, but is short for immediate use, and only partially covered for third quarter. This interest has been absolutely unable to get metal to fill in the gap. It has important war work and has applied to Washington for assistance..

Production is Increased

Pittsburgh, April 16.—Production of pig iron in this district is continually increasing and is estimated at approximately 90 per cent of capacity. The Carnegie Steel Co. added another furnace to its active list during the past week and now has 49 of its 59 in operation. The scarcity of steelmaking grades has not been relieved to any extent and many consumers urgently have been seeking tonnages through different channels, some of them appealing to the war industries board. The shortage of basic iron is especially acute and some users seeking tonnages of this grade have abandoned their efforts and have sought bessemer iron instead. They have met with only limited success in their attempt. A valley maker has sold 2500 tons of bessemer iron to a manufacturer of high-grade steel for special purposes. It is learned that recent sales of bessemer iron which was stored along the Atlantic seaboard have cleaned up all of the available tonnages held there. Inquiry for foundry grades is not so pressing. One nearby furnace found it had about 15,000 tons on hand above obligations and sold the iron almost immediately, 4000 tons going to a consumer in this district. The committee on pig iron of the institute is considering differentials.

Selling is Restricted

Birmingham, Ala., April 16.—There is no free selling of pig iron in southern territory. The producers are not in a position to dispose of much iron for the second quarter and are not anxious to sell freely for the last half. Many orders already are on the books for the balance of the year. Even figuring on an increased production in this section, it is not believed that a great portion of the business to be offered can be accepted here.

Coke Car Supply is Good

Movement from Connellsville Region Well Maintained—Fuel Administrator Rules Against Renewal of Long Term Contracts

Pittsburgh, April 16.—The supply of cars in the Connellsville coke region continues to be large and was 100 per cent on the Monongahela railroad yesterday, while for the entire region it was approximately 90 per cent. A 70 per cent supply is promised for tomorrow on the Monongahela. The average of 100 per cent, however, is based on operations and not on the actual rating and inasmuch as operations are at the rate of about 75 per cent of capacity, the supply when given as 100 per cent really represents about 25 per cent under the total rating. Shipments are moving much more freely and practically no complaints now are being heard from furnaces because of a shortage of fuel. The output of coke will be greatly increased soon, provided the supply of cars is regular and adequate. This improvement will be made possible by reason of the fact that the first battery consisting of 640 ovens of the by-product coke of the Carnegie Steel Co., Clairton, Pa., probably will be in operation in about a month or six weeks. The 640 ovens, it is estimated, will produce approximately 50,000 tons of coke weekly, thus decreasing the demand on the Connellsville region that much and at the same time release 1000 cars each week, inasmuch as the coal for the Clairton plant will be transported by river. Operation of this plant also will make available a greater supply of laborers for other ovens in the Connellsville region. It may be that a number of ovens there will go out of blast when the Carnegie by-product plant begins to operate. Some consumers are of the opinion that free coke for both furnace and foundry grades will be available after the increased output has been brought about. Jobbers and dealers in coke in this district have received their licenses from the fuel administration. Production during the week ended April 6 totaled 333,065 tons as compared with 352,435 tons during the proceeding week, according to *The Connellsville Courier*.

Can't Renew Contracts

New York, April 15.—Permission to renew coke contracts for the usual 5-year period has been denied to eastern blast furnaces by Dr. Harry A. Garfield, federal fuel administrator. The furnaces were desirous of renewing these contracts on the customary sliding scale based upon the price of pig iron. The ruling of the fuel administrator, however, provides that coke contracts may be made only at or under the government maximum prices. It also provides that contracts may be made only for deliveries within a 12-month period and also that no contract will be allowed which is scheduled to expire later than 18 months from the date on which the contract is made. Sales of coke in the east have been small during the past week.

Shipments Moving Better

Cincinnati, April 15.—Shipments of both foundry and furnace coke from the Connellsville district are moving more freely. Cars are in better supply and they are handled more promptly by the railroads. This cannot be said about either the Pocahontas or Wise County districts, although considerable improvement is reported on shipments from those fields. New River appears to be also lagging behind on foundry coke shipments. New business is light, and with the exception of a few foundry coke contracts there is very little to report. Some coke for domestic purposes is being sold but the tonnage is insignificant.

Shipments Again Slump

St. Louis, April 13.—According to dealers here shipments of coke from the east, which loosened up rather promisingly during the latter part of March, have dropped off again, and during the past week hardly exceeded 50 per cent. In the St. Louis district proper there has been less inconvenience than elsewhere, due to the fact that the leading by-product plant here has been producing at the rate of from 700 to 800 tons daily, and most of this tonnage is being applied to local consumption. The principal furnace has been drawing 200 tons daily from this source. To the west there is a growing scarcity. Points in Iowa, which have not concerned themselves with the St. Louis market in years, have had inquiries here this month.

Inquiries Are Persistent

Birmingham, Ala., April 16.—Inquiries are numerous for coke and even small contracts, involving a few cars a week, cannot be accepted in the southern territory. Hope is expressed that some relief may be brought about shortly by a greater output at the coal mines.

Scrap Market is Waiting

Commission Question Still Dominates Situation—Washington Conference Slated for Next Week—Some Weakness Shown

FOR COMPLETE SCRAP PRICES SEE PAGE 1020

Pittsburgh, April 16.—Developments have taken place during the past week which leads the trade in this district to believe that the war industries board will grant scrap dealers and brokers a commission of 3½ per cent. Most consumers are in favor of this commission being allowed and they brought considerable pressure to bear on the board to this end. The committee on steel and steel products of the American Iron and Steel institute apparently desired that this question should be left to the government body for determination when it decided recently that it would not recommend the payment of a commission on the ground that such action might be interpreted as permitting sales above the government maximums. In the meantime the market in this district is extremely dull but if a commission is allowed activity is expected to develop.

Foundries Buying Cast

Boston, April 15.—There is quite a fair movement in the local scrap market, with all New England foundries busy and buying cast scrap of all sorts, but especially stove plate. The railroad situation is less of an obstacle to shipments to points outside of New England than it was a short time ago and since a fair number of cars became available last week, a goodly quantity of material was moved to Pennsylvania. At the same time the transportation situation is far from normal and the fact that the trade in general is waiting for a decision in the matter of commissions also tends to restrict business. Prices do not change much, but the tone of the market can be said to be firm. Wholesale dealers' paying prices per gross ton, f.o.b. cars, shipping points, follow: Wrought No. 1 yard long, $29 to $29.50; horseshoes, $29 to $29.50; cotton ties, $21 to $22; stove plate, $19 to $19.50; No. 1 machinery, $31 to 32; No. 2 machinery, $27 to $28; car axles, iron, $42 to $43; steel, $42 to $43; rerolling rails, $30 to $31; iron boiler plate, $33 to $34; bundled barrel hoops, $16.50 to $17.50; wrought iron pipe, new specifications, $28 to $29; steel rails, $25.50; No. 1 railroad steel, $25.50; heavy melting steel, $24.50 to $25; axle turnings, $20 to $21; machine shop turnings, $14 to $15; cast borings, $15 to $16; drop forge trimmings, $22 to $23; cast iron car wheels, whole, $27, broken, $31.

Market is Listless

New York, April 15.—Listlessness characterized business in the New York iron and steel scrap market during the past week. With the exception of cast scrap, which continues in fairly good demand, few grades were sought. The question as to whether or not commissions will be granted to dealers is as yet undecided. In the meantime the original ruling of the subcommittee of the Iron and Steel association is being observed. Despite the dullness of the market, prices on all descriptions are unchanged.

Market is Balanced

Philadelphia, April 16.—Mills in this district are receiving as much scrap as their requirements call for, while their buying is equal to the supply being offered. The market therefore is practically stationary, being neither strong nor weak. Heavy melting steel is a trifle stronger and is quoted at $28 to $29, delivered. Other grades are unchanged. The American Board of Scrap Iron Dealers, together with the subcommittee on scrap and the general steel committee of the American Iron and Steel institute, will go to Washington next week to take up with the price-fixing committee of the war industries board the question of dealer's commission and price revision on unshipped contracts of April 1.

Conditions Are Unchanged

Buffalo, April 16.—There is no change in the general scrap market here. A strong unsatisfied demand for cast scrap, steel scrap, stove plate and low phosphorus. Some foundries, short of pig iron are substituting case scrap as far as possible. Prices remain unchanged.

Consumers Cancel Contracts

Cleveland, April 16.—Cancellation of scrap iron and steel contracts by consumers in cases where dealers show a tendency to hold out for the price in effect prior to the $1 reduction ordered by the President for the second quarter is the present feature of the local market. Consumers reason that they can abrogate contracts without loss because they can go out into the market and buy at the new lowered maximums. Dealers, however, complain against this action and believe they are entitled to the old price, at least in instances where they were ready to make shipment before April 1 and were prevented by railroad transportation difficulties or some other cause beyond their control. Despite numerous cancellation, scrap iron and steel dealers here are more optimistic and believe a turn for the better is due. Dealers would not be at all surprised were their 3½ per cent commission reinstated shortly. They do not expect the price-fixing committee of the war industries board voluntarily to take this action, but are confident that if the American Iron and Steel institute recommends it Washington will accede.

Dealers Are Indifferent

Cincinnati, April 15.—The indifferent attitude of scrap dealers is being reflected generally in the trade. The foundries are content to purchase only enough scrap to carry them through to July 1. Sales to the rolling mills are also very much curtailed. The new price reduction now is generally understood both by sellers and buyers. The clearing away of this confusion has not contributed to any increase in business. The most important and most encouraging feature is the better movement of scrap to the large consuming centers. Buying prices are weak and it is reported that selling figures are frequently revised downward on desirable business.

Chicago Market Weakens

Chicago, April 16.—Decidedly weaker conditions prevail in the Chicago scrap iron and steel market, largely due to lack of demand, but in a measure also reflecting somewhat larger supply in some grades. The decline in prices is most marked in rolling mill and foundry grades while steel scrap is in good demand at practically the maximum. The leading independent steel manufacturer recently bought a round tonnage of heavy melting, said to be about 20,000 tons, and there is considerable demand for this grade for shipment to the Pittsburgh market where scarcity seems to exist. Railroads appear to be marketing more scrap than has been the case in recent months and a total of about 7500 tons is now current. While this is not a large tonnage under ordinary conditions, it is larger than has been available for some time. The Chicago, Milwaukee & St. Paul offers 1800 tons, the Wabash 1800 tons, the Monon 1500 tons,

including 250 tons of steel rails, the Chicago, St. Paul, Minneapolis & Omaha 670 tons, the Chicago Great Western 500 tons, the Chicago & Eastern Illinois 350 tons and George W. Jennings 780 tons, including 100 tons of car wheels. The latter is one of few lots of car wheels which have appeared on the market in recent months.

Buyers Holding Off

St. Louis, April 13.—The scrap market throughout the week has been dull and uneventful. Both buyers and sellers are disposed to hold off awaiting developments. Actual sales were light, with prices showing little change. There has been some trading between dealers.

Lake Season

Will Open Soon as Ice Conditions Improve—Committees Organize

Cleveland, April 16.—Iron ore carriers of the Great Lakes will begin their 1918 navigation season within a few days. Ice reports are favorable and indicate that boats will be able shortly to reach the head of the lakes. Vessels will start next week if ice conditions continue favorable.

Organization of the work of handling the ore trade this year is being perfected by the various supervising committees. The mobilization committee will meet next week when complete records of the minimum ore requirements of each blast furnace are expected to be available. The vessel operating committee has been appointed and includes the three members who handled this work last year. They are W. H. McGean, Hutchinson & Co.; John T. Kelly, W. C. Richardson & Co., and A. W. Thomson, Wilson Transit Co., Cleveland.

Ore-carrying rates up to June 30 will be the same as last year. These rates are $1 net from the head of the lakes; 90 cents from Marquette, and 75 cents from Escanaba. From Escanaba to Chicago the rate is 60 cents. The rates cover the period up until third quarter iron and steel prices are fixed, but will probably continue throughout the year.

More manganiferous ore probably will be shipped this year. One estimate places the increased shipments of such ore from the Cuyuna range at 200,000 tons, or 33 per cent. Increased efforts to utilize domestic reserves and thus conserve ocean tonnage have brought about a greater demand for such ores to replace foreign manganese ores.

Great Plate Demands Grow

Car Program Needs Placed at 575,000 Tons—Mills Break Output Records and Makers Believe Capacity Adequate

Pittsburgh, April 16.—For reasons not made known here, the government's carbuilding program has been delayed. A meeting to be held in Washington tomorrow between government authorities and car builders may pave the way to the distribution of orders. Tremendous demands are being made and are to be made upon plate mills in connection with the carbuilding and shipbuilding programs, and also for the allies. England alone has asked for 300,000 tons for delivery as quickly as possible and it is reported the tonnage has been allocated among various mills. Japan, it is understood, is to get 200,000 tons of plates in return for the use of its ships by the United States. Of this quantity, 100,000 tons, it is reported, will apply on an old contract which had been canceled and it is assumed that prices in the original contract was made will be paid to the mills. On the other 100,000 tons, however, regular government prices will apply. The plate production of the Homestead works of the Carnegie Steel Co. in March broke all previous records and totaled 106,213 tons, mostly ship plates. The Liberty mill, which started operations early in October, 1917, turned out 17,240 tons, as compared with the estimated capacity of 12,000 tons. The best previous record of the Homestead mills was 90,960 tons. Exclusive of light and universal plates, it is estimated that the capacity in the United States is 300,000 tons a month and that it will require approximately 175,000 tons a month to take care of a shipbuilding output of 500,000 tons, deadweight. It is pointed out, therefore, that the mills will be able to take care of requirements both of this country and the allies. The domestic market is extremely dull. The only offerings reported are small tonnages of light plates.

More English Tonnage Placed

Philadelphia, April 16. — Further large orders for plates for delivery to England have been placed with eastern mills and call for the quickest possible shipment. It is understood th tathis tonnage is a part of that which the government is returning to England to replace 750,000 tons of various forms previously borrowed by General Pershing in order to save time and shipping space. A large part of this tonnage is being accumulated at eastern seaboard for shipment abroad. The Emergency Fleet corporation has placed additional plate tonnage with eastern makers. Some of the railroads have ben the buyers of several thousand tons for repairs.

Ship Tonnage Heavy

Chicago, April 16.—Allocation of ship steel, which is largely plates, continues active and in large tonnages. Constant addition of further shipyards which are completed and made ready for active service from month to month is adding to the demand for ship material. Orders are being booked much in excess of shipments, especially in plates, and every effort is being made to push through as heavy production as possible. Effort is also being made successfully to keep all shipbuilding activities supplied that no delay may be met from lack of material. Aside from shipbuilding necessities, comparatively little plate business is being taken.

Heavy Demand

Made Upon Mills For Rolled Pipe—Cost Needs Small

Pittsburgh, April 16.—Demand for tonnages coming to makers of iron and steel lap weld pipe from oil country interests is heavy and while some makers are taking additional business after scrutinizing their books, others are entirely out of the market for this class of pipe. Government orders are only moderate in size. The market for butt weld pipe is someare in a position to make shipments what more active and most producers in from one to two months on this kind of goods.

Western Demand Absent

Chicago, April 16. — Demand for cast iron pipe in the west, even though this is the season when summer activity is provided for, is practically absent and producers are finding almost nothing for their shops in this line. The inquiry from Twin Falls, Idaho, for 900 tons on which bids will be opened April 18, is about the only live inquiry now current. The United States Cast Iron Pipe & Foundry Co. is low bidder on 1500 tons at Springfield, Ill., and probably will be awarded the tonnage this week.

Clamp Lid on Deliveries

Only Essential War Material Now Gets on Bar Rolling Schedules —Makers Deluged With Specifications

Cleveland, April 16.—Consumers of steel bars in this district find it is practically impossible to place new orders with the mills except for Class A war work, in view of the more stringent policies as to new business just adopted by the leading producers. Consumers have been advised by some mills that it is useless to send in inquiry, for local representatives have been instructed not even to submit these to the works for a period of 30 days. No new promises of delivery whatever will be made by certain mills. Curiosity has been aroused as to how this new policy will affect the needs of the implement makers, which are of a class B rating. Some of the mills have been supplying these consumers only on the condition that they take a portion of their needs in bars rolled from discard steel. Mill orders to be accepted from nut and boltmakers are to be regulated by the average of straight war requirements which these users will be able to show from past records. For adaptors for shells to be made by a plant in this district, from 800 to 1000 tons of 3-inch cold rolled steel has been allocated to two makers. There is an active unfilled demand for large rounds and squares.

Bar Specifications Heavy

Chicago, April 16.—With considerable secrecy constantly surrounding placing of bar and other finished steel orders for government use, it is difficult to separate them and determine what tonnage is devoted to each product. However, bar tonnage is all that mills can accommodate, both for shell rounds and for bars going into ships, wagon equipment and a score of other uses. Agricultural implement makers have been active for some time and, as they take additional contracts for government work, especially for tractors, their needs have multiplied. Specifications are heavy and sales are in excess of shipments, with most new business for the government. Demand for bars to be used in nonwar material is less week by week as various manufacturers are filling their order books with government work. Railroads are not buying at present but the expected order for freight cars to be placed by the government hangs over the market with a heavy tonnage. Bar iron is quiet and mills are not anxious to book business except for spot delivery, while every producer is hanging back to be able to care for the demand which will come when the government places the expected order for freight cars. Each car will require about 2500 pounds of bar iron, which will give 125,000 tons if 100,000 cars are bought.

Manufacturers of hard steel bars dependent on old rails for their raw material are having hard sledding as practically no rails are coming out and the heavy demand from other quarters makes the market active without their being able to take on much of the business. A rerolling mill in this district has been fairly busy using discards from shell steel billets and rounds when it has not had sufficient rails to meet demands.

New Business is Light

Pittsburgh, April 16.—New business taken by makers of iron and steel bars involves only small tonnages. Makers are well booked, a good portion of their tonnage being for the government and some of them are not quoting on additional tonnages but are keeping the mills in a position to take more requirements that may be placed by the government from time to time. Practically all of the new business being accepted is for shipment at the convenience of makers.

Baldwin Buys Tonnage

Philadelphia, April 16.—An order for 4000 tons of iron bars, an unusual large order, has been placed with the eastern mills by the Baldwin Locomotive Works. This material will be used in the building of 1200 locomotives which the Baldwin works have slated to receive from the large government order. Included in the specifications are bars up to 3 and 4 inches. The order was placed under 3.50c, eastern mills. Otherwise the eastern bar iron market is quiet. Bar iron costs are rising and makers say there is very little profit for them in present government prices since most of the margin will be wiped out by the advances in puddling rates which the mills are about to put in effect. Practically no steel bars are being sold except reinforcing material, rolled from shell discards.

Shafting Market Dull

Pittsburgh, April 16.—The market for cold rolled shafting is dull. A large portion of the bookings are for the government which it is understood will come into the market soon for a large tonnage of small sizes. Deliveries have been deferred somewhat on account of heavy commitments but production has increased and makers are beginning to catch up on orders.

Government Business Prevails

Pittsburgh, April 16.—Makers of nuts, bolts and rivets in this district report that considerable business is being taken but it is chiefly for the government. Shipments are now being made satisfactorily and operations are proceeding almost at capacity. It is believed that the recommendation of producers that there be no change in prices during the second half will be acted on favorably by the war industries board.

New Standards

For Manganese Alloys Generally are Acceptable—Prices Vary

New York, April 15.—Expressions from consumers to the proposal by the subcommittee on ferroalloys of the American Iron and Steel institute, to lower the standards of ferromanganese and spiegeleisen to 70 per cent and 16 per cent, respectively, indicate that the new specifications are being adopted pretty generally. Sellers of ferromanganese say that new inquiries from some consumers during the past week stipulated 70 per cent metal. In one case, a consumer refused to buy ferromanganese slightly higher than 70 per cent though he was in urgent need. Indications are that only a few consumers will hold to the old standards. These include principally the tool and crucible steel manufacturers, whose practice necessitates the use of 80 per cent ferromanganese.

On several sales of 70 per cent domestic ferromanganese during week, some makers obtained a flat price of $250, delivered, while others sold at $3.50 per unit, making the delivered price for 70 per cent metal $245. On 80 per cent, the asking price generally is no lower than $275, delivered. Several hundred tons of English 78 to 82 per cent metal were made during the week for second half. Current inquiries call for about 1000 tons in the aggregate.

Fifty per cent ferrosilicon is slightly easier. Sales for second quarter were made at $170, delivered, during the past week. The market on prompt and second quarter is $170 to $180.

Future contracts continue at $155, delivered.

On spiegeleisen the market is quiet. The prevailing price is firm at $70, furnace, for 16 per cent.

Demand for ferrotungsten has improved considerably. The market on 70 per cent metal is firm at $2.30 per pound, furnace.

Alloy Prices Firm

Pittsburgh, April 16.—While demand for 50 per cent ferrosilicon is not heavy, it appears to exceed the supply. Consumers who have not covered for the last half appear to be withholding inquiries in the hope that there will be a reduction in prices. The quotation for this shipment ranges from $155 to $160, delivered, and that for prompt shipment from $180 to $190, delivered. One interest in the Pittsburgh district has sold a small lot of 20 to 25 per cent ferrosilicon on a basis of $100 a ton for 20 per cent and $3 per unit over that analysis. The market for spiegeleisen is firm and inquiry is fairly active. Makers say there is a scarcity of this alloy. Sixteen to 18 per cent is quoted at $70, furnace. Only fair demand exists for ferromanganese, but it is understood that a number of consumers have not covered their requirements. Hesitancy is being shown by some in accepting 70 per cent ferromanganese, the new standard, which is being quoted at $250, delivered, by most makers with a charge of $4 per unit over that base. One consumer in the Pittsburgh district has bought approximately 2000 tons of 78 to 82 per cent ferromanganese, shipment to be spread over five months, and it is understood that the tonnage was obtained before the new standard was fixed at around $250, delivered.

Ore Situation is Acute

Chicago, April 16.—Consumers of ferromanganese have come to the conclusion that the change of grade from 80 to 70 per cent is dictated by necessity and not by caprice and are coming into the market for their supply. Conditions as to ore supply are such that it would not be surprising if the standard were reduced later to even 60 per cent. Though the local producer has little tonnage remaining for the last half buying is active and the market is strong. The quotation is $250 per ton for 70 per cent ferro, with $4 per unit additional for manganese above the standard.

The Lackawanna Steel Co., Buffalo, blew in its new stack on March 27. The company now has eight stacks in blast.

Priority to Govern Cars

If Preference for Steel is Given Ships, Government Equipment Order May Be Modified—Price Question Unsettled

New York, April 15.—A reduction in the number of steel cars to be purchased by the railway administration may follow a series of conferences now being held with the war industries board relative to the question of priorities. In the possible event it is ruled that the shipping board shall continue to have first call, for all materials needed in carrying out its work, the railway administration may decide to build a number of cars of wood instead of steel as was originally intended.

Under the present program of the government, it is expected that at least 575,000 tons of plates will be needed in the construction of cars, in addition to a heavy tonnage of shapes, bars, etc. Due to the large quantity of material required for this work, the war industries board is said to be having difficulty at this time in coordinating the demands of the railway administration and the shipping board. To this difficulty is attributed much of the delay now being experienced in the allotment of car orders.

The question of prices also is understood to be a deterring factor in the purchase of railroad equipment. Although several conferences have been held between builders and government officials since specifications were issued several weeks ago, no definite understanding in this matter, so far as can be learned, has yet been reached. It is apparent from reports out of Washington that the government is intent upon driving a close bargain. The car and locomotive builders proposed to do the work on a basis of cost plus 10 per cent, but this proved unsatisfactory to government officials who, in one of their counter proposals, suggested 6 per cent as being a fairer profit. Manufacturers of specialties have been asked to pool their patents and allow various plants to produce their appliances without royalties. This proposal also is meeting with opposition on the part of manufacturers. Bids on refrigerator, flat and general cars will be asked later.

The bulk of demand in the present car market is for tank cars. Recent inquiries include 100 to 200 for the Great Western Contracting Co., Kansas City; 25 to 50 for the Houston Railway Car Co.; 25 to 50 for the Acme Petroleum Co., Tulsa, Okla.; 18 for the New Orleans Industrial Alcohol Co., Houston, Tex.; eight to 10 for the American Nitrogen Product Co., Seattle, Wash.; five for the Finkbine Lumber Co., Wiggins, Miss.; three to four for the Hazel Atlas Glass Co., Washington, D. C.

Cotton Tie Price

Fixed at $1.90 Per Bundle, or Reduction of $8.80 Per Ton

Pittsburgh, April 16.—The price of $1.90 a bundle of 45 pounds, mill, April basis, at which the cotton tie market was opened by makers on Monday of the present week compares with a price of $2.10 per bundle at which the market was opened on May 17 of last year, the highest level ever quoted. Steel bars last year at the opening of the cotton tie market were selling as high as 5.25c a pound, while the prevailing government price is 2.90c and the reduced price of cotton ties amounting to $8.80 a ton as compared with last year's price is due to the sharp cut in the price of steel bars. The market has been opened unusually early this year, largely because of pressure brought to bear by consumers. Mills are promising delivery at their own convenience. The price of $1.90 applies to the April basis for lots of 3000 bundles or more, while a price of $1.92 is quoted on lots of 1000 up to 3000 bundles. A carrying charge of 1c a bundle is provided for May and of 2c a bundle for June, and no quotations are being made after the latter month.

While no official estimate has been made it is believed that this year's cotton crop will total about 15,000,000 bales. It is not possible to estimate accurately the tonnage of cotton ties that will be required. Southern warehouses are said not to have large stocks on hand.

The following table shows the season's prices per bundle of 45 pounds since 1901:

1902	$0.80
1903	.85
1904	.75
1905	.85
1906	.85
1907	.95
1908	.85
1909	.70
1910	.75
1911	.75
1912	.70
1913	.80
1914	.65
1915	.85
1916	1.35
1917	2.10

New Lettings Show Loss

March Awards Are Rated at 47 Per Cent of Capacity—156,000 Tons Wanted for More Ships

New York, April 15.—The American International Shipbuilding Corp. has taken a contract for 60 additional 7500-ton steel freighters for the government, instead of 16 as reported last week. Including these, this interest now has orders for 180 government vessels, including one hundred and ten 7500-ton freighters and seventy 8000-ton combined troop and cargo carriers. For the 60 new vessels, about 156,000 tons of fabricated steel will be required. Bids for this steel will be requested shortly. The only structural work of note to come up during the week involves 9500 tons for extensions for the Crucible Steel Co. of America at Harrison, N. J., and Syracuse, N. Y., awarded to the American Bridge Co. Demand for plain shapes is at a minimum. Due to government lettings lately, however, the best mill deliveries now to be had are four to five months on standard sections and eight to 10 weeks on special sections.

The report of the Bridge Builders and Structural society shows that during March, 47 per cent of the country's shop capacity was contracted for. This is equivalent to 84,600 tons and compares with 55½ per cent or 99,950 tons in February. The drop was due to a falling off in government requirements and to the decreased demand for general building work. The report of lettings by recent months is as follows:

Month	Per cent	Approx. tonnage
March, 1918	47	84,600
February	55½	99,900
January	53	95,400
December, 1917	121	205,200
November	77	138,600
October	61½	110,700
September	29	52,200
August	38	68,400
July	41½	74,400
June	47½	85,500
May	56½	102,000
April	61	110,000
March	68	122,000
February	59	106,000
January	61½	119,000
December, 1916	86	148,000
November	78	134,000
October	77	133,500
September	52½	99,400
August	64	112,600
July	47½	83,600
June	58	100,000
May	80	137,000

Volume is Considerable

Philadelphia, April 16.—Practically nothing but government work is included in current shape bookings by eastern mills. The largest single order placed in the week called for 500 tons. Most of the business has been under 25 tons. The total volume, however, has been considerable and as a result the mills again are unable to take business under three to five months in standard sections. A fabricator needing 500 tons urgently was forced to buy from a warehouse.

Only Small Lots Taken

Pittsburgh, April 16.—Fabricators in this district are taking only small tonnages from commercial buyers, their operations being devoted principally to government requirements. Some of the business taken for domestic use involves small sizes which are taken from stocks.

All Tonnage for War

Cleveland, April 16.—Without exception, all the new requirements for structural shapes coming into the market are for war purposes. New inquiries include 1500 to 1600 tons for a dry dock at Galveston, Tex., a tonnage of railroad bridge work and material for 30 shipyard cranes of the modified hammerhead type for eastern yards, being figured upon by local builders. None of the sellers in this district have been able to quote on an inquiry for approximately 500,000 1¼-inch angles for wire entanglement supports which came out last week.

Government Takes Most

Chicago, April 16.—Fabricators find that government needs, principally for shipbuilding, are absorbing most of the output of structural mills. While it has been possible in recent weeks to book some tonnage and obtain deliveries from time to time between government shipments, it is noticed that such material is being shipped less frequently as shipbuilding needs are increasing. At present many fabricators are not able to take anything, even subject to delay, as they are far behind already. To make up for lack of ordinary construction, bridge shops and structural shops are increasing their output of ship parts and for the most part are busy.

CONTRACTS AWARDED

Factory building for Kilby Mfg. Co., Cleveland, 140 tons, to T. H. Brooks & Co., Cleveland.

Boiler house, for the Pillsbury Flour Mills Co., Minneapolis, Minn., 134 tons, to American Bridge Co.

Extension to plant of Edge Moor Iron Co., Edge Moor, Del., 250 tons, to Morris Wheeler Company.

Government chemical plant at Sautville, Va., 800 tons to McClintic-Marshall Co.

Buildings for Crucible Steel Co. of America at Harrison, N. J., and Syracuse, N. Y., 9500 tons to American Bridge Co.

New foundry building for Pratt & Letchworth Co., Buffalo, 1000 tons, to Buffalo Structural Steel Co.

Addition to Mills building, San Francisco, to California Steel Co.

CONTRACTS PENDING

Extension to refinery of California Hawaiian Sugar Co., Crockett, Cal., steel bids about to be taken; general contract expected to be awarded to Lindgren Co., Monadnock building, San Francisco.

Dry dock at Galveston, Tex., 1500 to 1600 tons, bids being taken.

Reduce Stocks

Of Tin Plate Considerably and Mill Operations Are Better

Pittsburgh, April 16.—Tin plate mills of the country during the past week operated at about 93 per cent of capacity and during the past three weeks stocks have been reduced by at least 300,000 boxes. Improvement is shown in the supply of cars but it still is inadequate in the Wheeling district. Tin plate makers expect to open their books for the last half early in May. The opening will be a more or less formal proceeding, inasmuch as no prices will be carried in contracts but will be left subject to the determination of the government and business will be allotted to regular customers only insofar as this is possible over and above requirements made by the food administration. The McKeesport Tin Plate Co. has purchased seven acres of Youghiogheny river frontage adjoining its present plant for the purpose of taking care of any future necessities that may arise.

Navy Nails

Largely Go to Pittsburgh Steel Co.—Sold on Fixed Base

Pittsburgh, April 16.—Most makers of wire and wire products in this district are confining sales to their regular customers and are cutting down on their requirements where possible. Operations of mills and the supply of cars have increased. Producers complain that they are suffering from a shortage of labor. The Pittsburgh Steel Co. received the bulk of the 40,000 kegs of nails placed by the navy department for shipment to its various yards. Some of the miscellaneous tonnage is understood to

have gone to the American Steel & Wire Co. Bids on these nails were made on a delivered basis and were calculated on the recommended level of $3.50 per 100 pounds, plus the freight rates to the points of delivery together with the freight war tax. Provision was made for any increase in freight rates so that the added charge would not fall upon the producers.

Chicago Market Quiet

Chicago, April 16.—Conditions in the market for wire and wire products are quiet and there is comparatively little demand. Jobbers continue to take nails in fair volume, though building operations have been suspended to a degree that has cut this demand somewhat. Annealed wire for bale ties is also in demand and the export tonnage asked is not lessening.

Sheet Output

Checked by Lack of Steel—Corrugated Discrepancy Adjusted

Youngstown, O., April 17.—Lack of steel, together with the shortage of box cars greatly has curtailed the production of sheets in this district. While the box car situation is better than it has been for several weeks, there is still room for improvement. The leading sheetmaker has several mills idle on account of a shortage of sheet bars. Another maker in the upper part of the valley also has several mills idle for the same cause. The latter maker has bar mills under construction, but these will not be completed until July. This maker, however, is producing open-hearth ingots and expects to overcome his shortage of semifinished steel by having them converted into sheet bars by an outside mill. The government has been having trouble with the corrugated sheets rolled in this district. When the sheets were used for roofing and siding, the corrugation on some would not overlap the corrugations on others. It was found that sheets 29 inches wide were being corrugated by some mills, while others used sheets 30 inches wide. To overcome the trouble experienced in assembling the sheets, representatives of the mills in question met in Washington recently with government officials and came to a definite conclusion concerning the width of the sheets before passing them through the forming rolls.

Want to Ship Customers

Philadelphia, April 16.—Sheet makers have brought to the attention of the government that unless they are able to produce simultaneously with war orders, some material for regular customers, the latter may have to go for months without receiving steel. In the meantime, the government is about to place large additional orders for blue annealed sheets for trench covers. The leading eastern maker is out of the market. Western makers are offering only high carbon sheets rolled from shell discards.

Steel Shortage Acute

Pittsburgh, April 16.—Operations of sheet mills in this district are proceeding at a low rate, due to an acute shortage of sheet bars. The supply of cars also is inadequate. The situation is serious in view of the extremely heavy tonnages that have been and are being placed by the government. Producers are being called upon to supply large tonnages within short and specified periods and it is difficult to see how the severe schedules laid out can be made. The American Sheet & Tin Plate Co. will open its books for last half requirements early in May. The allotting of tonnages to regular customers will be made and the company will enter blanket contracts for so much tonnage at prices to be named by the government.

Operation is Curtailed

Chicago, April 16.—Sheet mills as a general rule are out of the market, from half to two-thirds of producers not being able to take on further business. This results from lack of sheet bars, which are unusually scarce, and this has caused mill operation to be somewhat curtailed. Demand for steel sheets would be strong if producers allowed it to come to the surface and most consumers are in need. Some customers have recently been able to place contracts for third quarter delivery to about half of their requirements.

Steel Buyers Go Begging

Shortage of Marketable Semifinished Material More Severe—Bethlehem Wants Sheet Bars—Shell Tonnage Allotted

Philadelphia, April 16.—An inquiry for 10,000 tons of sheet bars for delivery at the rate of 2000 tons monthly has been put out by the Bethlehem Steel Co. for shipment to Sparrows Point. A Philadelphia mill continues unable to locate 2000 tons of billets for rolling into large rounds. Small inquiries are numerous. Semifinished material is harder to get on account of the improvement in traffic conditions. The finishing mills are using up more steel due to less congestion and makers as a result have less material to market.

Anxiously Seek Tonnages

Pittsburgh, April 16.—Insistent inquiries for tonnages of sheet bars continue to come to makers and brokers, but despite the somewhat increased production the shortage is extremely acute. The difficulty of the situation is heightened by reason of the enormous demands that are to be made by the government for shell steel, which make it necessary for some producers to divert their capacity to its needs instead of devoting them to commercial requirements. Sheet mills especially are short of bars. While tin-plate makers are also in need of tonnages, they are being supplied much better than other consumers. Miscellaneous inquiries are being made for billets but no tonnages are being offered. There appears to be somewhat freer offerings of discard billets and the market for this grade is slightly easier. Some makers continue to hold 4 x 4 discards at the government price of $47.50, Pittsburgh, fixed for the regular product, but others are offering tonnages at $45. Demand for forging billets is active, but no sizable lots are being offered. Limited tonnages are reported to have been sold during the past week at $60, Pittsburgh. There is also a shortage of slabs for which some platemakers are inquiring. No offerings of wire rods are being made in this district.

Nothing for Open Market

Cleveland, April 16.—Makers of semifinished steel in this territory are being kept filled up by government work and they have nothing to offer in the open market. Practically no sheet bars or other forms except for strictly government requirements are being shipped to finishing mills. Users in northern Ohio have been besieging producers, but have received no encouragement. Large orders for semifinished steel are being filled for the government. A new one of this character just received calls for 20,000 to 25,000 tons of square billets for British delivery. A Canton mill which recently has been offering open rolling space for large rounds and squares has inquired for 1500 tons of rerolling billets, but has been unable to locate this material.

Mills Supply Great Tonnage for Ships

Steel Director Replogle Before Senate Committee Shows 2,374,711 Tons of Plates Under Order for War Purposes—750,000 Tons Borrowed of England, Being Returned—Questions Adequacy of Plate Rolling

WASHINGTON, April 16.—The testimony of J. Leonard Replogle, director of the steel division of the war industries board, before the senate committee on commerce April 5, has been released for publication and discloses in detail the tonnages of steel production for shipyards week by week from Jan. 5 to March 30.—It also discloses that Mr. Replogle contends there is "a decided and very acute shortage" of plates, a view opposite to that held by Judge E. H. Gary and other officials and members of the American Iron and Steel institute.

The actual shipments of steel on Emergency Fleet corporation orders, during the first quarter this year, aggregated 618,177 tons, as against actual requirements of 590,428 tons. Of the total ship steel tonnage rolled by the mills, 374,741 tons represent the quantity of plates produced for the yards during the quarter. Mr. Replogle did not show what the plate requirements were during that period but he declared the steel furnished in the first three months was at a rate of 550,000 tons of ships per month.

Shipments Exceed Requirements

The steel director, in his letter to Charles Piez, general manager of the Fleet corporation, which was introduced in Mr. Replogle's testimony, declared that in the "five weeks ending Feb. 2, which would really be January delivery, 106,594 tons of plates and 175,943 tons of all kinds of steel, including plates, shapes and bars, were shipped to you. In the four weeks ending March 2, which would cover February shipments, 125,526 tons of plates were shipped and 209,383 tons total steel. In the four weeks ending March 30, 142,261 tons of plates were shipped and 282,851 tons total steel." These shipments compare with the January requirements of 180,761 tons, February 181,694 and March 227,973. The net surplus of shipments over requirements was 27,749 tons.

Some idea of the ship steel ordered was given by Mr. Replogle when, in response to a question by Chairman Fletcher of the senate committee, he declared that "there are 2,374,711 tons (of plates) on order." This he divided as follows: "Sixty-two thousand tons of that is for the army; 182,000 tons of it is for the navy; 831,018 tons is for the Emergency Fleet corporation. The total orders for plates for the United States government are 1,203,000 tons. Canada has 700,000 tons, England 53,000; France 39,800 tons; Italy, 43,000 tons, and the balance is domestic, non-government commerce, for the locomotive builders, the car builders, the builders of tanks for oil refineries and work of that character."

Concerning the railroad program, Mr. Replogle told the committee Director General McAdoo will require 575,000 tons of plates. In addition to this demand, there are 300,000 tons due England as the plate portion of 750,000 tons of steel General Pershing obtained from France and England to meet urgent needs of the American forces. England wants this tonnage now and Mr. Replogle told the committee he had been instructed to furnish her with 5000 tons a week. The shipping board, he said had approved the arrangements. Nothing was said concerning the war trade and shipping boards' arrangements with Japan for the exchange of steel for ships.

As pointed out in THE IRON TRADE REVIEW last week, Mr. Replogle told the committee the shipyards' claim of steel shortage has been due to lack of definite information of each yard's requirements. Transportation has figured prominently as a cause of nondelivery, it was shown. Of 63 per cent of the steel which had left the mills for Hog Island, on March 16 the receipts at that yard amount to about 3 or 4 per cent, Mr. Replogle said. Blame was also placed on the shipping board's early arrangement of having eastern steel fabricated in western plants and then shipped back to eastern yards. Replying to Senator Fletcher's statement that "the Hog Island people claim that they got better prices from western mills than they could get from the eastern mills," Mr. Replogle replied:

"Well, I think that the United States government has sufficient power, in war time, to compel eastern fabricators to come down to a fair and reasonable price; and I think that could have been done."

Shops Without Drawings

He added that "a number of the fabricators have reported that they have a very large tonnage of steel on hand and were unable to work it up on account of not having detailed drawings."

E. N. Hurley, chairman of the shipping board, was present when Mr. Replogle testified and the committee arranged that the shipbuilding chief should interrogate the steel director. During this questioning Mr. Hurley brought out the fact that Mr. Replogle disagrees with Judge Gary, James A. Farrell, and other steel producers on the question of whether there are sufficient plates being rolled. Mr. Replogle said he told Judge Gary that the institute's committee was creating an entirely wrong impression and that contrary to the opinion that there is a surplus there is a serious shortage. On Mr. Hurley's insistance that Judge Gary should know what he is talking about, Mr. Replogle replied:

"Mr. Hurley, I do not mean to dispute Judge Gary's knowledge of the situation; but he is not in a position to know the requirements of the united governments. There is only one place that that information can be obtained, and that is down in our office."

Mr. Replogle admitted some of the steel plants were behind in furnishing material to the fabricators. He said

Mills' Ship Steel Record for First Quarter

Week Ended	Tons Needed	Tons Shipped	Plates
Jan. 5		41,622	28,668
Jan. 12		32,616	19,339
Jan. 19		26,194	13,164
Jan. 26		31,647	19,565
Feb. 2		43,864	25,858
Total Jan.—	180,761	175,943	106,954
Feb. 9		33,317	20,005
Feb. 16		56,957	37,026
Feb. 23		53,823	30,685
March 2		65,286	37,808
Total Feb.—	181,694	209,383	125,586
March 9		52,261	34,282
March 16		63,422	34,874
March 23		55,304	33,488
March 30		61,864	39,617
Total Mar.—	227,973	232,851	142,261
Grand total—	590,428	618,177	374,741

the Midvale Steel & Ordnance Co., the Nagel Steel Co., and the Allegheny Steel Co. were among them, but denied any were giving preference to private orders over the government's. He emphasized the fuel shortage as a factor entering into the nondelivery of steel, declaring that the Midvale company's mill at Coatesville, Pa., had been idle from Jan. 17 to Feb. 20 because it had been unable to obtain fuel. He said that at the time the Garfield fuel order was issued, merchant bar production dropped from 137,000 tons a week to 55,000; plates dropped from 90,000 tons to 45,000; projectile steel fell from 67,000 tons to 37,000. He said even today pig iron production was at a rate of only 27,000,000 tons annually.

Corporation Loses Big Profit

Further denying that the steel industry is producing steel for orders on which higher prices are to be realized, he cited the instance of the United States Steel Corp. which has an order for 25,000 tons of plates for the Cunard Steamship Co. at 8c per pound and said that the Cunard company had been unable to get them because the Steel corporation is rolling plates for the government at the government price of 3.25c per pound. He said the same thing is true of all the other mills.

Replying to Mr. Hurley's criticism that the steel division was not following up its allocated orders, Mr. Replogle said that was not the function of the division; that that particular job belongs to the government's production departments. Mr. Replogle's statement was formally upheld by the war industries board a few days later when it announced its plan for reorganization.

Trade Leaders

Discuss Topics of Importance at Foreign Council Meeting

The fifth annual foreign trade convention opening April 18 at the Hotel Gibson, Cincinnati, is probably to be the most significant conference yet held under the auspices of the National Foreign Trade Council. Manufacturers, merchants and shippers will discuss the unprecedented world trade situation arising from America's intervention in the war and will take up the various problems which have accompanied the country's sudden rise in international commerce. Encouragement of foreign trade, safeguarding sources of supply, the merchant marine, foreign credits, trade education, trade extension in the Pacific, the small manufacturers, Latin-American trade, co-operation, and after war problems are among the topics to be dealt with by leading trade experts.

The underlying theme of the convention will be the part of foreign trade in winning the war. James A. Farrell, chairman of the council and president of the United States Steel Corp., in the call to this convention, emphasizes the new obligation which participation in the war has laid upon the foreign trade enterprise of the country. Our overseas commerce must proceed uninterruptedly and in the largest possible volume if we would win the war, he says, thus "steadily bringing to us the products necessary to the life of the enterprise on which we are embarked and steadily carrying to our allies and to our neutral sources of supply, the materials and manufactures that will enable them to maintain their efforts in the field or to continue to produce the food and raw materials so essential to our military success. More than ever the foreign trade of the nation serves a vital national purpose in maintaining the gold reserve and sustaining the huge bulk of national credit."

The secretary of state has assigned to the convention several consul generals and consuls from Europe, Latin-America and the Far East. The secretary of commerce has assigned experts of the bureau of foreign and domestic commerce who will be available for individual consultation. A representative of the Pan-American Union will give information concerning commerce with Latin-American countries.

Iron Sellers Organize

Philadelphia, April 16.—Merchant pig iron sellers met in this city today and organizd the Merchant Pig Iron Distributors' association, which is to handle matters of interest to sellers. W. S. Pilling, of Pilling & Crane, Philadelphia, was elected president, and W. W. Hearne, of the Matthew Addy Co., Philadelphia, secretary. Today's meeting was devoted entirely to the election of officers and the perfecting of an organization. Meetings are to be called as desired. The next meeting is scheduled for May 14.

Takes Over Furnace

The Princess Iron Corp. has been organized under the laws of Virginia to take over the Princess Furnace Co., the Callie Mining Co., the Circle Ore Co., all at Glen Wilton, Botetourt county, Va. Organization of the company has not yet been completed nor officers been elected.

Shell Turnings

May be Reconsidered for Classification as Low Phosphorus Scrap

New York, April 15.—Some users of low phosphorus scrap are hoping that the question as to whether shell turnings are to be sold as ordinary machine shop turnings, or whether they will command the low phosphorus scrap price again will come up for consideration. This question definitely was settled by a recent ruling of the subcommittee on iron and steel scrap of the American Iron and Steel institute. It having come to the attention of the subcommittee that the maximum price for guaranteed low phosphorus scrap was being offered for shell turnings, the subcommittee decided that shell turnings should command no higher a price than any other turnings. In view of the subcommittee's ruling, shell turnings now cannot be sold any higher than $19, delivered, which is the maximum on machine shop turnings.

Under the maximum price schedule, dealers and producers of scrap naturally find it to their advantage to sell to plants taking the lowest freight rate, so that in many cases low phosphorus scrap users are said to be prohibited by the disadvantages of their location from obtaining shell turnings. Since shell turnings range under 0.04 per cent in phosphorus and sulphur, it is held by some interests in the scrap trade that they belong in the low phosphorus classification.

Buffalo Consumers Opposed

Buffalo, April 16—Consumers of low phosphorus scrap in this district unite in saying that they will not be benefited in the slightest if the agitation now under way to have shell turnings put under the classification of low phos scrap results in action along those lines by the government. The agitation is made on the grounds that users are unable to obtain heavy low phosphorus turnings, and that they want to use turnings.

The representation is being made that users will be more than glad to pay $36.50 for turnings as a substitute for the heavier grade. Statements of consumers in this territory fail to bear this out. Not only are very small tonnages of turnings being consumed in this market, but consumers do not want them at the lower price. The territory now is producing more tonnage of shell turnings than can be consumed here, and the output will be greatly increased within the next six months or six weeks. This condition is expected to proceed throughout the entire country.

Schwab in Charge

Of the Ship Construction in All American Yards

Charles M. Schwab, chairman of the Bethlehem Steel Corp., has been called by the government to speed up the shipbuilding program. President Wilson announced April 16, after a conference with Mr. Schwab, Chairman Hurley of the shipping board, Vice President Piez of the Emergency Fleet corporation, and Bainbridge Colby of the shipping board, that Mr. Schwab had accepted the position of director general of the Emergency Fleet corporation.

Mr. Schwab's wide experience in the shipbuilding field as well as the executive talents which have built up the Bethlehem Steel Corp. were desired by Chairman Hurley, who suggested his appointment. The March record of ship construction fell behind the anticipated total and during the past few weeks the shipping board has been endeavoring to bring construction up to the minimum estimates. Mr. Schwab will have direct supervision over actual ship construction and will be responsible for hurrying the work at all of the shipyards of the country.

He is the fifth to assume this work, his predecessors being Major General Goethals, Rear Admiral Capps, Rear Admiral Harris and Mr. Piez. The latter voluntarily relinquished the post of general manager in order to give Mr. Schwab a free hand. Mr. Piez continues as vice president in charge of administrative matters, while Chairman Hurley will direct the board's policies, including the placing of contracts.

Immediate Action

On Equipment Orders Urged Upon Government—Fear Delay's Effect

New York, April 16.—Are the same disastrous methods of procrastination which delayed the execution of the shipbuilding program last summer also going to delay the government car building program is a question now agitating the minds of car builders. After having been originally called to Washington March 25, the builders have been put off on several occasions, and a meeting scheduled for yesterday has been postponed until tomorrow by the government. The builders are waiting only for the word to proceed with the execution of the contract.

It is claimed that the main reason for the delay is the government's intention to get the lowest possible prices. Car builders say the prices are secondary matter and that the primary consideration is to get the cars built. It is pointed out that five months will be required from the date of the order to deliver the first car because new plate forming dies must be made and specialties manufactured. Immediate placing of the business is being urged upon the government committee headed by John Skelton Williams, with a request that the question of prices be threshed out later. Already one month has gone by without action. The cars, it is believed, must be delivered early in the fall if they are to serve as a means of protection against a reptition of last winter's freight congestion. The government locomotive orders also are being delayed.

Wants Full Outputs

Philadelphia, April 16. (By wire.)—The government now is insisting that practically 100 per cent of steel produced shall be applied to its requirements. Severe rebukes have been administered on eastern mills for shipping even small tonnages elsewhere. This attitude of the government effects all finished products. Several mills now have representatives at Washington in an attempt to show the output for the government will not be reduced by producing simultaneously some tonnage at least for regular customers. One of the lines particularly affected is sheets.

Quotations Corrected

In the April 4 number of THE IRON TRADE REVIEW on page 833 the price of bessemer pig iron, Pittsburgh, was quoted at $37.25. This quotation should have read $36.15, Pittsburgh, in accordance with the reduction made by the war industries board on April 1. The basic quotation also should have been $32.95, Pittsburgh. The correct quotations appear on page 832 of the April 4 issue.

Plan Big Terminal

New York, April 17. (By wire.)—General Goethals has announced the government will build a $20,000,000 embarkation terminal at Philadelphia similar to the terminals to be built at five other Atlantic ports.

Propose Stock Increase

A meeting of the stockholders of the Trumbull Steel Co., Warren, O., will be held May 17 in which action will be taken on the proposed increase in its capital stock. The board of directors recommends that $8,000,000 in common be added to the capital stock of $12,000,000.

The Non-Ferrous Metals

Copper Lead Spelter Tin

New York, April 16.—A meeting of the solder, white metal and bearing metal trades was held at Washington this week to discuss means of conserving tin. A government expert explained to representatives of the trades various ways by which they might save a few per cent of tin here and there in their mixtures. This meeting emphasizes the shortage of tin which the country has been facing, due to the shifting of American buying from London to the Far East and the increased consumption in tin plate manufacture and other essential industry. Practically no prices are heard for spot tin, except that odd lots of 99 per cent grades are offered at prices of 88c to 99c. It was reported during the week that the United States government has bought 1000 tons of tin in the Singapore market and that this metal now is afloat.

The spelter market continues to decline. Offering of prime western spelter for prompt shipment from the West were reported this week at 6.75c, St. Louis, a new low price for the present movement. Future positions are commanding a slight premium over prompt, but as far ahead as July and August can be bought at around 7c, St. Louis. The government is taking considerable high grade spelter at the fixed price of 12c, St. Louis.

The American Smelting & Refining Co. last week reduced its lead quotation from 7.25c to 7c, New York, owing to underselling in the outside market, but this reduction did not take up all the slack, and outside sellers now are quoting 6.85c to 6.90c, New York, for prompt, April and May shipment. The outside market is quiet.

Some reports are current that copper producers are going to endeavor to attempt to obtain a higher price for their product at the termination of the present agreement June 1, 25c being mentioned as against the present fixed price of 23.50c. In general no developments are reported in copper, the supplies being apparently sufficient to fill the demand. Less than carload lots of lake, electrolytic and casting continue to be turned over at 23.50c plus the 5 per cent commission which brings the quotation to 24.67½c.

The antimony market is lifeless. Spot metal has been offered at 12.50c, duty paid, without interesting buyers. However, the metal seems to be in strong hands, for no further shading is reported.

The aluminum market is quiet at the fixed price of 32c for 98 to 99 per cent ingot in 50-ton lots, with extras for smaller quantities.

Trumbull Steel Co.'s Strip Mills

Both Hot and Cold Rolled Strip Steel is Now Being Made—Mills Are Gear-Driven by Variable Speed Motors Equipped With Push Button Controls

TRENCH mirrors, which are one of the requisites found in nearly every Sammy's comfort kit reflect the image that comes in their pathway just as efficiently as glass mirrors. When they fall they do not break into a thousand pieces and if they are given reasonable care there is always part of the surface available for the reflection of a Sammy's determined expression. Thousands of these mirrors are used to a good advantage both in this country and in France. Whether hung in a dugout or carried in a soldier's pocket, they are always ready for service.

The Uses of Strip Steel

It is interesting to know that trench mirrors are manufactured from strip steel. Steel billets are heated and passed through rolls, the final pass disposing of them in strips. As these issue from the hot mill they have a dull black color. The scale is removed from the surface of the strips by submerging them in a solution of dilute sulphuric acid after which they are annealed and passed in a cold state through other rolls. The strips attain a smooth finish while passing through these rolls and finally after a further buffing, they find their way to France in one of the pockets of the comfort kit.

Strip steel is used to manufacture other commodities such as bedsteads, cornices, locks and keys, hinges and other hardware supplies. It is also extensively used in building Pullman cars and for making automobile brake bands, fenders and windshield frames.

The officials of the Trumbull Steel Co., Warren, O., recognizing the huge demand which the future holds for strip steel, authorized the construction of hot and cold strip mills some time ago. They were designed by the company's engineers. The cold-strip mills were placed in operation May 15, 1917. Strip steel was purchased from outside sources in order to operate the cold-strip department until the hot-strip units were completed. This was only a matter of a few months, for on Dec. 1, 1917, the first billet was rolled on the 16 and 20-inch hot-strip mills which were built by the United Engineering & Foundry Co., Pittsburgh. The roll trains, tables, shears, reels and other auxiliaries are all electrically driven. The motors were built by the General Electric Co., Schenectady, N. Y., and are said to constitute one of the most complete rolling mill drives in the country.

The hot strip mill is housed in a building 100 x 1000 feet, which was erected by the Riter-Conley Co., Pittsburgh. The mill consists of three stands of 20-inch rolls with three edger rolls all arranged in tandem and five stands of 16-inch rolls. Billets and slabs from 4 to 18 inches wide and from 3 to 10 feet long are used in rolling the hot strip steel. At present these are purchased from an outside mill and brought to the hot strip department in gondola railroad cars. However, the Trumbull Steel Co. has completed five 100-ton open hearths and has two others under construction, besides a 36-inch blooming mill and a sheet bar mill. When these units are placed in operation, the company will not be dependent on outside mills but will be self-contained as far as billets and slabs are concerned.

Handling Raw Material

As previously mentioned, the billets and slabs are received in railroad cars which are switched inside the hot-strip mill building, at the south end. Here the stock is unloaded and

FIG. 1—GENERAL VIEW OF THE HOT STRIP MILL SHOWING THE 200-FOOT COOLING BED, THE ELECTRICALLY DRIVEN REEL AND SHEAR AND NARROW GAGE SERVICE TRACK

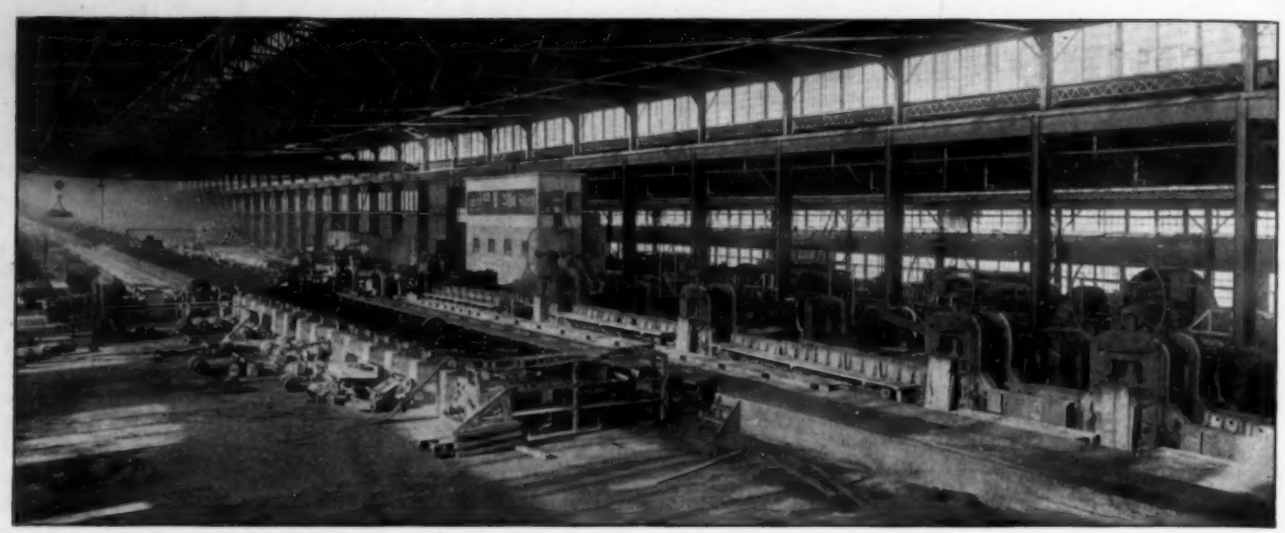


FIG. 2—VIEW OF PART OF THE 20-INCH MILL WHICH IS EQUIPPED WITH MANUAL SCREW-DOWNS—THE 16-INCH MILL IS SHOWN IMMEDIATELY AHEAD

piled by an electric magnet attached to one of the 15-ton cranes which serves the mill. Two cranes are provided. They were built by the Pawling & Harnischfeger Co., Milwaukee. The billets and slabs are heated previous to being rolled in an automatic gravity discharge furnace designed by Alex Laughlin & Co., Pittsburgh, and rated at 300 tons per 24 hours. Two furnaces are provided, each equipped with water-cooled skid plates at the discharge end. The furnaces are shown in Fig. 3. They are heated with producer gas, two Morgan producer gas machines being provided for this purpose. These are housed in a building near the hot strip mill. Before the gas is passed into the furnace it is mixed with air supplied by a centrifugal fan. The latter is driven at 975 revolutions per minute by a 30-horsepower Westinghouse motor.

The billets are transferred from the stock pile onto a rail-type table located between the heating furnace and the pusher. The latter is driven by a 40-horsepower motor and is equipped with a double arm ram which pushes the billets into the furnace. When the billets have attained the desired heat for rolling, they are pushed out of the furnace and deposited on the shear approach table, 60 feet long. After having the ends cropped by means of a shear, the billets are delivered to the first edger rolls where most of the scale is squeezed off and then to the first pass of the 20-inch flat mill. This mill, shown in Fig. 3, consists of three stands of two-high rolls and three stands of edger rolls all arranged in tandem. This mill operates in conjunction with the 16-inch flat mill which consists of five stands. Nos. 1 and 2 stands of the 16-inch mill are arranged in tandem to the 20-inch mill; No. 3 stand is arranged parallel to No. 2 stand, and Nos. 4 and 5 stands are arranged parallel to No. 1 stand. The 16-inch mill is shown in Fig. 2 opposite the operator's pulpit.

In the 20-inch mill, the distance

FIG. 3—VIEW OF THE AUTOMATIC GRAVITY DISCHARGE FURNACES AND ROLL TRAIN OF THE 20-INCH MILL THE MILL DRIVE IS SHOWN TO THE LEFT

between No. 1 edger and the first pass is 15 feet; that between the first and second passes is 13 feet; between the second pass and No. 2 edger is 33 feet; between No. 2 edger and the third pass is 32 feet; and between the third pass and No. 3 edger the distance is 9 feet. After the drawn-out billets pass through No. 3 edger they are delivered 36 feet ahead to the first pass of the 16-inch flat mill. Then if a light gage is going through the mill the strips are delivered 55 feet ahead to the second pass and thence to a runout table 76 feet long. The strips are then transferred at right angles across a chute-type transfer table and deposited on an approach table which first delivers the rear end of the strips to the third and fourth passes. As the strips issue from the fourth pass the ends are caught by a pair of tongs and guided into the fifth stand of rolls where they receive the finishing pass. This last set of rolls delivers the strips onto a 200-foot runout table which moves them straight ahead toward a vertical shear installed at the end of the table. This shear, trims the ends of the strips before they are attached to the motor-driven reel which is installed 5 feet ahead. This reel is shown in Fig. 1.

The coiled strips measure from 200 to 250 feet in length depending, of course, upon the gage rolled. If for any reason the strips become crinkled while in transit, the corrugated sections are eliminated by means of the shears and the remaining sections are wound into coils.

When the mill is rolling heavy-gage strips, the billets are roughed on the 20-inch flat mill, and instead of being given five passes on the 16-inch mill they are given three or even two, depending upon the gage desired. Issuing from the last edger rolls, the drawn-out billets pass through No. 1 stand of rolls of the 16-inch mill onto a 55-foot runout table. The strips are then transferred across a chute-type transfer table to a table which serves the No. 4 stand of rolls of the 16-inch mill. After the strips pass through this stand of rolls they are received by a runout table and transferred up a chute-type transfer to the No. 5 stand approach table. Here again the finishing pass is given and the strips are delivered to the runout table directly ahead. They are then transferred at right angles across a cooling bed of the grate bar type to a 262-foot table which conveys the strips forward to a vertical shear. The cooling bed and table are shown in Fig. 1. The shear is installed at the discharge end of the table and cuts the heavy-gage strips into multiples.

The 20-inch flat mill is driven by a 1500-horsepower, adjustable speed induction motor and the 16-inch flat mill by three 20-pole, 1200-horsepower, induction motors. The larger one and two of the smaller ones are housed in a leanto, 30 x 240 feet. The motors which are of the wound rotor induction type, use 3-phase current at 2300 volts and are of a heavy, rugged construction, especially designed for rolling mill service. Each motor is provided with a double range Scherbius speed regulating equipment to give a speed range from 450 to 270 revolutions per minute. The larger motor has a continuous rating of 1500 horsepower from 450 revolutions per minute to synchronous speed and 1200 horsepower at 270 revolutions per minute. The three motors which drive the 16-inch flat mill have a continuous rating of 1200 horsepower each at all speeds from maximum to minimum.

For regulating the speed of the motors, a 360-kilovolt-ampere, commutator-type, alternating-current motor direct connected to a 275-kilowatt, 2300-volt, induction generator, which operates at 514 revolutions per minute, is provided. This equipment provides practically continuous speed range from maximum to mimimum speeds. The commutator motor impresses a voltage on the secondary or rotor of the main motor of such value as to give the desired speed regardless of variations in the load; the main motor, however, retains all the normal characteristics of an induction motor which runs without speed regulating equipment.

When the main motor is running below synchronism the commutator motor, which is connected to the slip rings of the main motor, operates as a motor, and the slip energy of the main motor, less the transformation losses, is returned to the source of supply through the induction generator. When running above synchronism energy is supplied to the secondary of the main motor from the commutator motor which operates as a generator; this energy is obtained from the source of supply through the induction generator which operates as a motor. The speed adjustment is obtained by means of a motor-operated field regular.

This field regulator is operated from a control switch of the push button type, located at the operator's pulpit. An eight-panel switchboard for the control of the mill motors, regulating sets, auxiliary motors and tables is housed in the building opposite the 16-inch mill.

After the strips of steel are coiled, they are transferred from the reel onto a two-wheel hand truck in which they are hauled toward the north side of the building and piled on the brick floor. A magnet suspended from one of the cranes transfers them to the west end of the building where they are stored. Officials of the Trumbull Steel Co. are planning to install an automatic conveying system in the near future, which will handle the coiled strips in a more convenient manner. Along the south side of the building a narrow-gage industrial track is installed, as shown in Fig. 1. This track connects with one on the opposite side of the building and is used for hauling the heavy-gage strip steel from the mill to the pickling department. The trucks are drawn by an electric locomotive. This means of transportation relieves the cranes for other service in the mill.

The pickling department is housed in a leanto, 48 x 96 feet, at the west

FIG. 4—VIEW OF THE 12-INCH MILL IN THE COLD ROLL DEPARTMENT

end of the hot strip mill building. It is equipped with two revolving type, four-arm pickling machines built by the Mesta Machine Co., Pittsburgh. They are steam operated. In order to remove the scale which adheres to the surface of the steel, the strips and coils are submerged for a short time in dilute sulphuric acid and then washed. The strip steel is now in condition to be annealed and shipped or rolled further in the cold-roll strip department.

In the latter case the coils are piled on a four-wheel truck and hauled to the cold-rolling department by means of an electric tractor. This department is housed in a building, 100 x 320 feet, which is south of and parallel to the hot-strip mill building. To make it as comfortable as possible for the workmen in the winter, the building is heated with hot air distributed through a centrally located main. This main, shown in Fig. 5, is connected to a heater fitted with vertical steam coils around which the air is forced by means of a multivane fan. This fan is directly connected to a continuous running motor. The heater is installed in the powerhouse located in the southwest corner of the building. In this department two motor-generator sets are also installed. The generator of one set is driven by a 1080-horsepower motor built by the Westinghouse Electric & Mfg. Co., Pittsburgh. The motor which operates at 514 revolutions per minute, uses alternating current at 2200 volts and is rated at 1058 kilovolt-amperes. The generator produces direct current at 750 kilowatts and 250 volts. The other generator set was furnished by the General Electric Co., Schenectady, N. Y. This motor rated at 1400 horsepower and 1400 kilovolt amperes uses current at 2300 volts. It is directly connected to a generator which operates at 720 revolutions per minute and produces direct current at 250 volts and 4000 amperes. The alternating current is purchased from the Trumbull Public Service Co., Warren, O.

Capacity of the Cold Strip Mills

The cold-strip mills have a monthly capacity of 3000 tons and will roll strips of steel from ½ to 16 inches wide and from 0.006 to ½ inch thick in lengths up to 300 feet. The 8-inch, 12-inch and 16-inch mills consist of four stands each of two-high rolls. They were built by the Waterbury Foundry & Machine Co., Waterbury, Conn. The stands of each mill are arranged in tandem and are fitted with individual controls of the push-button type, which when pressed stop or start the rolls as the case may be. A close-up view of the 12-inch mill is shown in Fig. 4. All stands are also equipped with speed change panels which control the speed of the rolls. Each set of rolls is connected through reduction gears to individual Westinghouse motors which use direct current supplied by the motor-generator sets previously described. This mill has a capacity of approximately 45,000 pounds per 10 hours.

The 12-inch mill is rated at approximately 60,000 pounds per 10 hours. It is fitted with 12 x 16-inch rolls. The 16-inch mill located on the north side of the building has a capacity of approximately 120,000 pounds per 10 hours.

The strips of steel are placed on a horizontal reel about 10 feet in front of the No. 1 stand of either of the three mills. One end of the strip is guided into the first set of rolls, then to the second and so on until it passes through the last set. It is then attached to an electrically driven vertical reel which coils the strip as it issues from the final pass. The coil is tied so that it will not unravel, removed from the reel and placed on a wooden skid, as shown in Fig. 4.

Between 75 and 80 per cent of the cold-rolled strips are trimmed before being shipped. For trimming the edges of the coiled strips two pairs each of single and combination gang slitters have been installed. The strips are passed through these slitters and then given another finishing pass, two sets each of 8 x 10 and 12 x 16-inch single rolls being installed for this purpose. If the steel is sold in strips instead of coils it is passed through leveling and cutting machines where it is cut into the desired multiples. The loose scrap which collects around the cutting and slitting machines is compressed in an electrically driven bailing machine and taken to the open-hearth furnaces where it is re-melted. A general view of the cold-strip department is shown in Fig. 5.

Coiled stock from the cold rolling mill is piled on skids and transferred to the annealing department. This department is located in the south side of the building and is separated from the cold-strip department by a wall built endwise through the center of the building. The department is served by two 25-ton Morgan cranes. The strips from the cold mills are delivered to the annealing department

FIG. 5—GENERAL VIEW OF THE COLD-ROLL STRIP DEPARTMENT SHOWING THE LEVELING AND CUTTING MACHINES THE ROLL STANDS ARE LOCATED IN THE FAR END OF THE BUILDING

on four-wheel trucks drawn by electric tractors. Six furnaces are provided for annealing the stock. They are hand fired and have a capacity of approximately 80,000 pounds per 12 hours. The strips are piled in boxes fitted with covers and placed in the annealing furnaces, the temperature of which is held between 1400 and 16 degrees Fahr. After the strips are thoroughly annealed they are withdrawn from the furnaces and passed through an oiling machine which applies a coat of oil to the surface. This tends to prevent oxidation. The material is then transferred to the shipping department which adjoins the annealing department.

Products of the Mill

Besides strip steel, the Trumbull Steel Co. manufactures blue annealed, black and galvanized sheets, terne and tin plate, and formed roofing products. The sheet and tin mills were described in the Sept. 11, 1913, issue of THE IRON TRADE REVIEW. Within the next few months the Trumbull company will also manufacture ingots, blooms, billets, slabs and sheet bars. The officers of the company are: Jonathan Warner, president; W. H. B. Ward, first vice president; A. N. Flora, second vice president; W. M. McFate, secretary; Lloyd Booth treasurer; T. P. Draper, general manager; E. T. Sproull, general sales manager; and S. L. McCormick, general manager of the strip mills.

New Skip-Type Ladle Tilter

ONE of the most important blast furnace auxiliaries is the pig casting machine. This apparatus must be held in readiness to dispose of any molten metal which may be sent from the furnaces. Any lengthy delay in pouring the iron from the ladles increases the cost of production, in that all or part of the metal freezes in the ladle and forms a skull. Frequently in loosening the skull the bricks are damaged which necessitates relining the ladle.

Probably the first piece of apparatus called upon for service when a ladle of iron is brought to the pig machine is the tilting equipment. At some of the older plants this equipment consists of a hook, chain and davit which are operated hydraulically; at other plants a traveling crane is used. Recently, an improved ladle tilter has been designed by the Pennsylvania Engineering Works, New Castle, Pa. The tilter is electrically driven and similar in appearance to a blast-furnace skip incline. Three units are installed at the New Castle works of the Carnegie Steel Co.

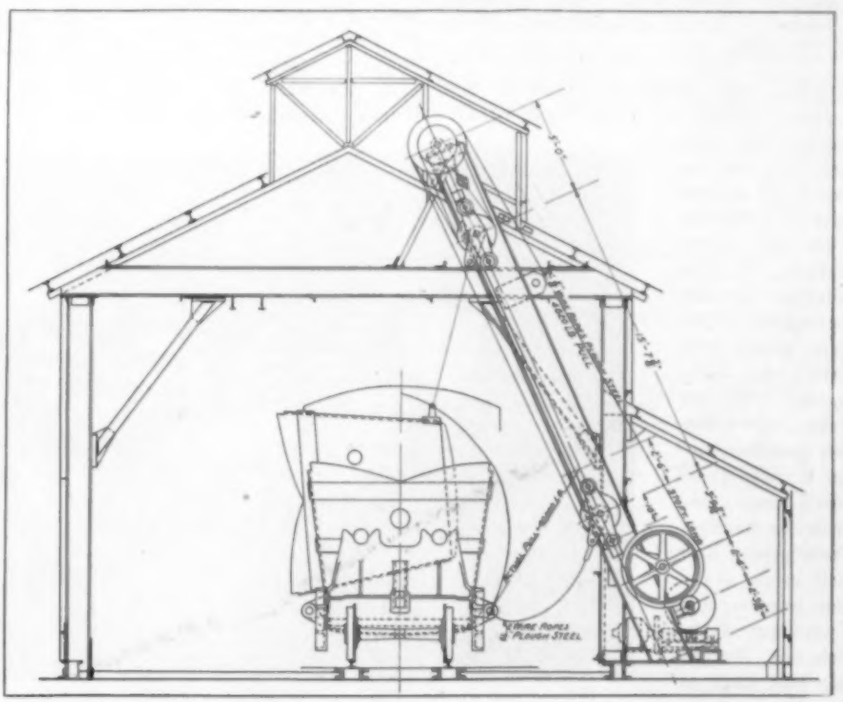
Method of Operation

The 50-ton ladle is placed in position for pouring so that when it is tilted the metal will flow into the master trough and thence into the distributing trough which is placed at right angles and feeds the two strands of pig molds. Two 1¼-inch, plow-steel wire ropes, with one end of each attached to a hook and the other securely anchored in a socket carried by a movable sheave block, are used for tilting the ladles. The actual pull required to tilt the ladle is 40,000 pounds. The movable sheave block contains six sheaves. They are arranged parallel on a common shaft, the ends of which are journaled to side frames. These frames are fitted at both ends with flanged wheels which operate on two parallel I-beams. The beams are equipped with bumping blocks near the ends, between which the movable sheave block operates. The operating distance is 15 feet 7⅜ inches. The beams are inclined at an angle of 24 degrees and support a shaft at the upper end. Six sheaves are mounted on this shaft and arranged in line with those on the movable block.

The sheave blocks are connected with a 2⅝-inch wire rope which passes around No. 1 sheave of the movable block then over the No. 1 sheave of the stationary block at the top and so on until all sheaves are brought into service. This rope, 370 feet long, is made of plow steel, the driving end being attached to a drum near the base of the inclined I-beams. The drum is driven by a 5-horsepower motor although only 2½ horsepower is required to move the rope 6 feet per minute.

The motor is directly connected to a worm driving shaft which transmits the power through a worm wheel to the drum bull-gear. The latter is attached to one end of a shaft which is free to move inside the drum collar. The other end of this shaft is fitted with the male section of a cone clutch, the female section being attached nearby on the end of the drum. By means of connecting arms the control of the clutch is brought over to a centrally located control lever which is installed near the motor control box. When the ladle is to be tilted the operator engages the clutch and starts the motor gradually. The maximum tilting position is shown in the accompanying diagram. To bring the tilting hook to the starting position, the clutch is disengaged and the weight of the ladle pulls the lower sheave block down the incline.

The Hession Tiller & Tractor Co. has leased the plant formerly occupied by the Chase & Baker Co., Buffalo, for the manufacture of pianos and will install equipment to manufacture tractors.



TILTER SHOWING POSITION OF LADLE AND SHEAVE BLOCKS

Curbing Waste in Motor Trucking

Train Dispatching Methods Proved Effective in Reducing Waste in the Transportation and Delivery Departments of the Youngstown Sheet & Tube Co.—Supervision is Effective

THE greatest source of loss in motor-truck operation lies in the idle truck miles, and next in order come loss of time in loading and delays due to poor routing. To reduce these factors of waste to a minimum, a comprehensive system for keeping in touch with a large fleet of motor trucks has been adopted by the Youngstown Sheet & Tube Co., Youngstown, O. This company, which has developed a plan similar in character to a train dispatching system, keeps in continuous service the following trucks:

Kind of truck	Capacity in tons
1 Pierce Arrow	2
2 Pierce Arrow	5
1 White	3
1 Gramm	3
3 Nash Quad	2
6 Ford delivery cars	½

When the company installed the present system of dispatching motor trucks, the first step was the selection of definite delivery stations. With the co-operation of the different foremen throughout the plant, points were selected best reached by the trucks, and whenever possible, under a crane where heavy loads could easily be handled. These points were each given a station number and a sign put up at each one. A road map was made of the plant and the location of each station shown so that no matter how little the driver knew of the plant, he would have little trouble in making deliveries to the proper places. This map is shown in Fig. 5.

There are at present about 75 established delivery stations at the main plant, five at the coke plant and 12 at the rod and wire branch of the Youngstown Sheet & Tube Co. The stations are numbered in order along the length of the plant, allowing for the possible addition of one number in five. The numbers for the plants are assigned, divided in series and 200 stations allowed for each.

A truck dispatcher has been appointed with headquarters in the receiving department. Immediately after he commenced work, a list of delivery stations was sent out to each foreman with notice that the trucks would handle deliveries of material for any department in the plant when the order was properly placed with the dispatcher. The station list was in constant use so that it was found advisable to have it printed in booklet form, vest pocket size, for the convenience of the foremen.

The receiving department record is utilized in making deliveries of incoming material. The foreman in writing out his requisition on the purchasing department designates the desired delivery station. This is put on the purchase order, a copy of which is sent to the receiving department. It is therefore a simple matter to mark the delivery station number on the receiving record when checking from the order. The serial number of the receiving record is marked in red crayon on every box, package or piece after being checked. Two copies of the record are then turned over to the dispatcher. All other orders for truck service are made out in duplicate by the dispatcher on the record of deliveries form, Fig. 4. This is filled out in in detail at the time the order is placed. As a rule the orders are taken by telephone which is better than waiting until a written order can arrive by mail. The delivery orders are padded

FIG. 1—THE TRUCK DISPATCHER, SHOWN AT THE RIGHT, CONTROLS ALL TRUCK MOVEMENTS FROM THIS DESK

in triplicate, so that a foreman may keep a copy of each order for his own information. In every instance the dispatcher is supplied with two copies of every request for truck service.

Truck Dispatching

As soon as delivery orders are received the dispatcher files them in labeled pigeon-holes according to the direction in which the load is to go, or according to the route the truck will take in reaching a certain terminal station. The first trip of the day for each truck is planned the evening before and placed in an appropriately labeled pigeon-hole. As soon as the orders for one load are given a driver, the next load for the same truck is planned and filed.

When the orders for a load have been grouped, the dispatcher notes if there are receiving department orders on the list, and sees that the different items, according to the serial numbers marked on the parcels are located and grouped for loading When the truck arrives the orders are given to the driver who checks the items by number as they are loaded.

The drivers have strict orders to leave no material unless they can get the signature of some responsible party on the file copy of the order. If possible, the signature of the one who placed the order originally is obtained. This feature practically eliminates misdeliveries.

The Truck Train Sheet

Before him on his desk the dispatcher has a sheet, ruled up in columns representing each half hour of the working day. The horizontal ruling allows a given number of lines for each truck. When a truck leaves the dispatcher enters the exact time in the column of the nearest half hour Then, gaging by his knowledge of the time he thinks it will take to complete the trip, the dispatcher draws a line to the column in which

FIG. 2

THE YOUNGSTOWN SHEET & TUBE CO.
TIME RECORD OF FOREIGN TRUCKS RENTED BY COMPANY

Truck Driver will call for this ticket on entering Mill Gate, have same stamped at gate and keep it until his *final* trip out that day. On leaving mill on his last trip out he will have it stamped at gate and leave it with gateman. Be sure and comply with this rule as this ticket properly stamped verifies your claim for truck hire.

Gateman will comply with above requirements and forward this ticket on the following morning to Superintendent of Stores.

Truck Dispatcher will provide one ticket for *each* foreign truck hired and leave at gate sufficiently early to insure against delay. Send first copy of this ticket to Superintendent of Stores daily; keep second copy for record.

Truck Dispatcher fill in the following:
Safety Dep't.—Allow entry and exit for foreign truck of

Truck Driver fills in the following:

Above named operators will not write below this line.

Audit Clerk—If record is not clear or does not check, mark square at right with an "X" and attach memo. explaining.

To Sup't. of Stores—Allow ..... hrs. @ ..... $

THIS TICKET DOES NOT TAKE THE PLACE OF THE REGULAR COMPANY PASS NOR CONFLICT WITH ANY REGULATIONS OF THE GENERAL SUPERINTENDENT'S OFFICE OR OF THE SAFETY DEPARTMENT.

FIG. 3

MOTOR DELIVERY SERVICE CARD

TRUCK NO.	CAPACITY	DATE
DRIVER'S NAME		CHECK NO.
HELPER'S NAME		CHECK NO.

SPEEDOMETER

	OUT	Miles Traveled	Av. Time Per Mile
IN			

TIME

	OUT	ELAPSED TIME	IDLE TIME
IN			

INTERMILL TRIPS

No.	FROM	LEFT	TO	GROSS	WEIGHT

FIG. 4

SERVICE CARD RECORD OF DELIVERIES No. .....

DATE	REQUISITION NUMBER	SHOP ORDER NUMBER	CHARGE ACCT.
ORDER NUMBER	JOB NUMBER		WANTED DATE / A. M. / P. M.

QUANTITY	DESCRIPTION	WEIGHT
	THIS COPY TO BE SIGNED BY ... AND RETURNED BY ... TO THE MERCHANT'S CLK.	

MOVE		NOTIFY	
FROM STA. No.	TO STA. No.	NAME	DEPARTMENT
REQUESTED BY	DEPARTMENT	FOREMAN NUMBER	
DELIVERED BY / DATE	TRUCK OR ENGINE No.	RECEIVED BY / DATE	

FIG. 2—TIME RECORD FOR RENTED TRUCKS FIG. 3—DRIVER'S REPORT CARD FORM
FIG. 4—SERVICE RECORD OF DELIVERIES, MADE IN TRIPLICATE

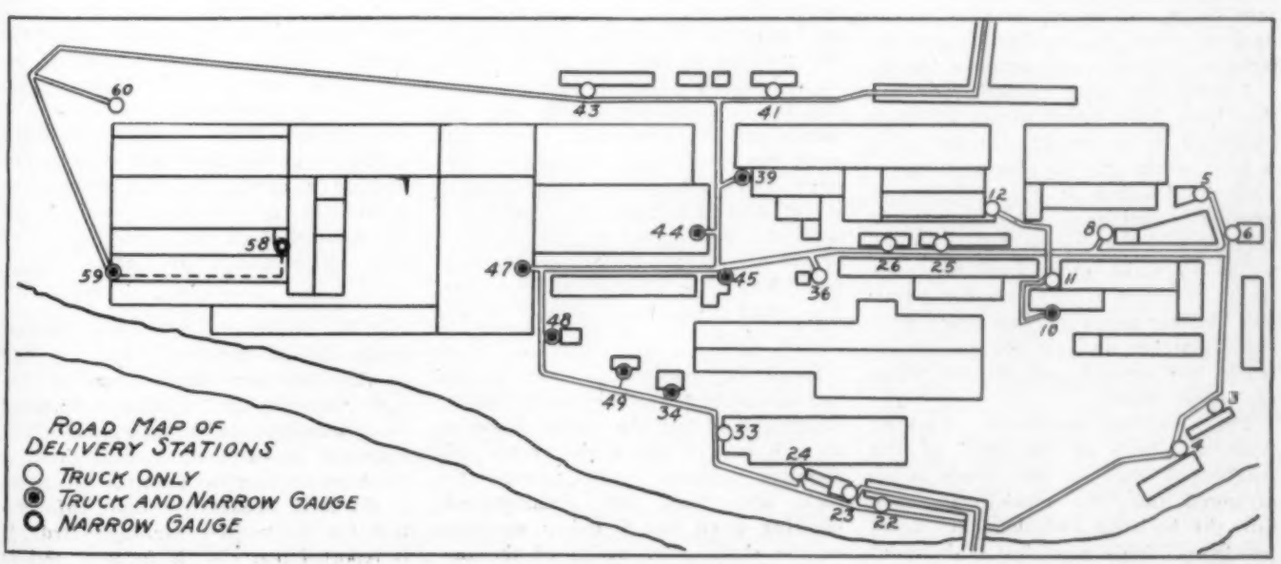


FIG. 5—MAP SHOWING DELIVERY STATIONS, WHICH TAKEN WITH THE STATION NUMBERS, FURNISHES AN EASY GUIDE FOR THE DRIVERS

the time of return would fall. Above this line he enters, in order, the station numbers of the various stops with any information he may think necessary. When the truck returns the time is entered in the correct column and if any difference between the estimated time and the actual time is noted an explanation is asked.

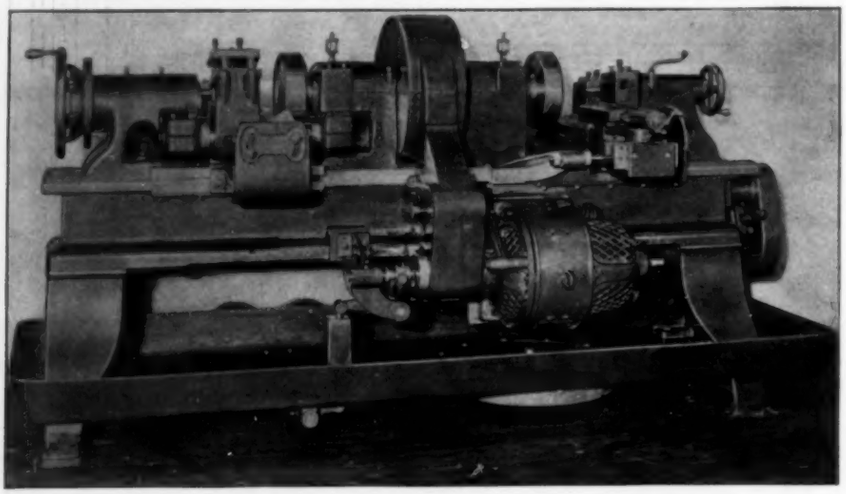
As there is a telephone at almost every delivery station it is possible to reach the driver at any point along his route. Drivers have instructions to take orders from no one but the dispatcher and if any dispute arises the dispatcher is called upon for a decision.

Each driver fills out a trip card, shown in Fig. 3, which he leaves with the dispatcher at the close of the day's work. This gives the record of mileage and tonnage for the day, the number of trips made, the time of arrival and leaving each station and reports of any delays or accidents during the day. This card and the tape from the recordograf, which is used to check up the driver's entries, make a complete and accurate record.

Among the most valuable features that have been found to aid in truck operation is a freight checker who is kept in the city to plan and supervise the loading at the freight and express stations. Shortages are checked and the freight bills grouped so as to make up a load for each truck expected at the transfer point The checker keeps in close touch with the dispatcher and advises how many trucks are needed and is told when to expect them.

The receiving warehouse checking floor was built at the level of the trucks. A stall for one truck is so arranged that the truck may back into the building and the steel doors let down. This provides a sheltered place to unload in cold weather. A 5-ton monorail crane directly over the stall quickly moves heavy pieces to another part of the floor. Directly in front of the warehouse is a large truck scale. Inbound and outbound tonnages are weighed and recorded here. Facilities for prompt unloading have been arranged for wherever possible and platforms the height of the trucks have been built at the most important stations.

It has been possible through proper supervision to obtain great flexibility in the service. A complete record is kept of all work done and through the efforts of the dispatcher, loads are kept at a maximum, and the idle truck miles and time of delivery are reduced, with a great saving in costs.



CENTER DRIVE LATHE

Center Drive Lathe

The center drive lathe, shown in the accompanying illustration, was originally designed for use by the Ford Motor Co. in turning both ends of driving shafts simultaneously. The work is passed through an opening in the left-hand tailstock, the opening being brought into position by indexing the barrel of the tailstock 180 degrees, at which position the work passes directly into the spindle in the headstock. After the work has been passed through the tailstock, the tail spindle is again indexed at 180 degrees bringing the center into position. The work is then mounted on the centers, after which the floating-type chucks are clamped to the work. The chucks are then secured to the driving plate.

When the machine is started, two carriages feed toward the center of the headstock and turn the various diameters at each end of the work. While this diameter turning is in process, the back arm tools are simultaneously squaring down the shoulders necessary on the shaft. The action of the carriage transmits radial motion to the back arm block. This motion is obtained through the medium of the cam slot which is secured to a bracket fastened to the rear of the carriage.

An extension arm having a roller in contact with the path cam, is secured to the back-arm bar and block. By this arrangement, the cam in its longitudinal travel along the bed necessarily imparts a rocking or radial action to the back arm block and tools, which perform the squaring operation.

This machine is driven by a 5-horsepower motor running at 1100 revolutions per minute. The stopping and starting of the spindle is controlled by an internal expanding clutch provided on an extension of the motor shaft. The drive from the motor to the head spindle is through a set of sprockets, a chain and an idler pulley being provided to take up the slack. These machines have been designed by the Reed-Prentice Co., Worcester, Mass.

Attack Fire Losses

To awake "the fire conscience of the people of Ohio," the industrial fire prevention committee of the Industrial Commission of Ohio, will hold a fire congress in Memorial hall, Columbus, during the week of May 27. Delegates from various state and city organizations, numbering approximately 1500 will attend and addresses will be delivered by the foremost fire prevention experts in the country. In calling attention to the special need for fire prevention in war times, this commission states that fire losses in the United States during 1917 are reported at $268,000,000, an increase of $68,000,000 over 1916. In the state of Ohio, the gain was $1,500,000, with losses in 1917 totaling $8,490,031.

Director of Safety Victor T. Noonan of the Industrial Commission, states: "During the war every fire is a calamity which delays the world's peace. President Wilson recently declared, 'a preventable fire is more than a private misfortune, it is a public dereliction.' This congress is being called to obtain data and information and as a result, the fire prevention committee will be in a position to recommend such rules and practices that will minimize fire losses."

J. W. Richards, professor of metallurgy, Lehigh university, has reported to the American Electro-Chemical Society that the use of electric furnaces for producing steel is increasing. This statement is based on returns from a questionnaire sent to about 50 engineers in the steel business to secure information for the naval consulting board. It is reported that electric furnace steel is particularly adaptable for castings.

Viscosity of Blast Furnace Slag

The Application of Viscosity Data to Show the Relation Between Composition and Softening Temperatures of Slags Gives an Insight Into the Effects of Sulphur Distribution in the Stack

BY ALEXANDER L. FEILD

THE bureau of mines is investigating the problem of slag viscosity, in variation with the temperature and with the composition of the slag, and its effect upon the distribution of the sulphur between molten iron and slag, as introductory to a series of contributions to the theory of the metallurgical processes. The method of measurement, viscosity apparatus, furnace and other accessories mentioned in this paper have been described fully in a bureau of mines report. The viscosity of blast furnace slag had not been measured previous to the investigation described in this report. A number of investigators have determined the "fusibility", or softening temperature, of slags by means of the cone method or other deformation method, but these methods supply only limited information regarding the temperature-viscosity relations of the slag in question. Any deformation method that may be employed indicates only the temperature at which the slag attains a more or less definite viscosity, the magnitude of the value obtained depending on the method used. An isolated measurement by Doelter on a single mixture at 1300 degrees Cent. represents the highest temperature reached in the various viscosity investigations previous to those described in this report, in which results have been referred to absolute units. Arbitrary deformation tests have of course been made at much higher temperatures.

Theory of the Method Employed

In these investigations the author has used a modification of the method originated by Margules in 1881. In this method the liquid is confined between two concentric cylinders. The outer cylinder is rotated at a constant speed and the torque exerted upon the inner cylinder is measured. The method is applicable to liquids of a wide range of viscosity. The principle of the method employed by the author is therefore not a new one. The torsion method, however, had not hitherto been employed at all for measurements of viscosity at temperatures higher than are generally used in testing oils, etc., that is, about 250 degrees Cent. Quite paradoxically it appears to be the only method of measurement which is possible experimentally over a large range of temperature and of viscosity, and for this reason may be called a quite universal method. In applying the method to temperatures as high as 1600 degrees Cent., which is about 400 degrees Cent higher than the property of viscosity had been hitherto measured by means of any method, certain modifications in the construction of the apparatus were necessary and which alone made possible the attainment of a relatively great accuracy under the rather severe experimental conditions. These modifications consisted in the use of Acheson graphite in the construction of all parts of the apparatus subjected to high temperatures, and in the use of a system of damping the suspended system so as to give to it the stability and aperiodicity characteristic of the familiar damped D'Arsonval galvanometer.

The present modification of the method of Margules has been applied without difficulty to measurements on slags over a range of viscosity from 200 to 3000 (H_2O at 20° Cent. = 1). This range of viscosity was considered sufficient for the purposes of the investigation. It is certain, however, that the method is applicable over a much wider range of viscosity than this.

For a full discussion of the theory of the method the reader is referred to the *Bureau of Mines Technical Paper* 157. It is sufficient here to say that the viscosity of the substance under examination is proportional to the torsion couple exerted on the inner concentric cylinder and inversely proportional to the speed of rotation in revolutions per second; while, conversely the torsion couple is proportional to the viscosity and to the speed of rotation. With cylinders of fixed dimensions, therefore, and with the inner cylinder suspended by means of a calibrated steel ribbon, the viscosity of the slag melt is directly proportional to the product of the angular velocity of the outer cylinder and the deflection produced by means of the confined slag melt upon the inner cylinder.

Application of Viscosity Data to Metallurgical Operations

Before taking up the description of the viscosity apparatus, furnace and accessories, the tabulation of the experimental results obtained, it is advisable to consider briefly the application of accurate viscosity determinations on metallurgical slags to manufacturing processes, and also to related research in this field. Particular attention must be given in the present paper to a consideration of the principles of the metallurgy of iron, although in many other metallurgical operations, such as the smelting of copper for instance, a knowledge of the temperature-viscosity relations of different types of slag is of great importance.

Apart from the question of mining cost and freightage, the value of an iron ore sufficiently rich in iron to be considered marketable is largely dependent upon whether it can be made to yield economically a slag of desirable viscosity and desulphurizing power. A casual glance at the slag analyses in Table I shows at once the comparatively wide range of slag composition that has been found practicable by different manufacturers. In each case the particular slag composition was undoubtedly determined in a large measure by the composition of the ore mixture and fuel which it was deemed expedient to use and also by the grade of iron produced. However, it is entirely probable that in certain cases the slag composition was not the optimum one from the standpoint of economy and excellence of product. It is one of the purposes of these investigations to determine what are the optimum conditions.

In spite of the lack of scientific research on the physical and chemical properties of slags at high temperatures, it is quite well understood what functions the slag must perform in the blast furnace. In the first place, it must be sufficiently fluid to flow from the cinder notch at the tempera-

The author of this paper, Alexander L. Feild, is assistant metallurgist, U. S. bureau of mines. This paper was presented at a meeting of the American Institute of Mining Engineers.

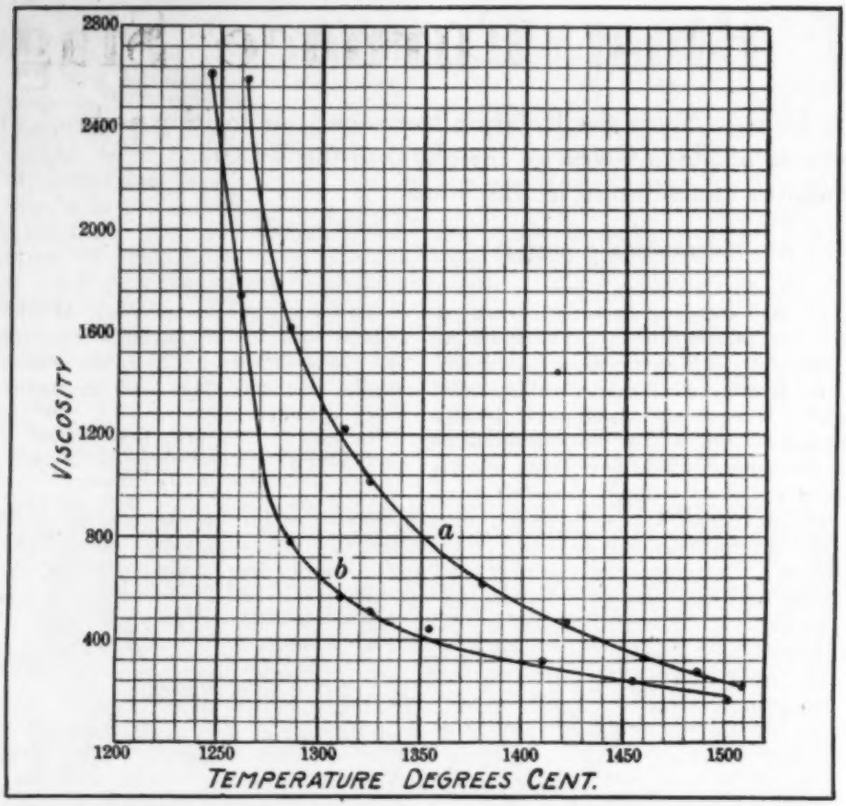


FIG. 1—(a) TEMPERATURE VISCOSITY CURVE OF SYNTHETIC SLAG CONTAINING 48 PER CENT CAO. (b) SAME SLAG IN WHICH 20 PER CENT CAO HAS BEEN REPLACED BY 20 PER CENT MGO

ture which exists in the hearth. In the case of charcoal practice where desulphurization is a minor item the viscosity of the slag at flush is a primary consideration. If, for instance, it is found that a siliceous charcoal slag possesses a viscosity of 800 at the temperature of the hearth, the question arises whether a limey slag would perform its functions properly if it possessed an equal viscosity. The limey slag may be prevented from performing these functions for one or both of the following reasons. In the first place, the limey slag with a viscosity of 800 might have an extremely high rate of change of viscosity with temperature, that is, this particular point on the temperature-viscosity curve might occur at a temperature where the slag underwent rapid softening or hardening with small changes of temperature. In the second place, it might not be at a sufficiently high temperature properly to desulphurize the pig iron.

Desulphurization and Slag Viscosity

The greater portion of the sulphur enters the furnace in the coke, in which it is present as ferrous sulphide to the extent of from 0.5 to 2 per cent sulphur. The total quantity of sulphur is for practical purposes entirely distributed between the molten iron and slag. It may be assumed quite safely that the sulphur which is dissolved by the pig iron exists as ferrous sulphide, FeS. On the other hand, it is necessary to assume in the case of the sulphur dissolved in the slag that it exists for the most part in normal slags as calcium sulphide, CaS. In high manganese slags, however, it is probable that a portion of the sulphur exists as manganese sulphide.

Ratio of Concentration

According to the well-known distribution law of Nernst, when a substance is distributed between two immiscible solvents, such as molten iron and slag, the ratio of the concentrations of the given substance in the two solvents, when the condition of equilibrium is reached, is constant for any given temperature, *provided* the dissolved substance has the same molecular weight in the two solvents. Moreover, in the case of several dissolved substances each substance distributed itself as though the others were not present.

Let us consider an ideal case where manganese is entirely absent from the slag and iron. Since calcium sulphide is insoluble in molten iron, the distribution effect must be that of ferrous sulphide between molten iron and slag. The ferrous sulphide present in the slag undergoes the following reaction:

$$FeS + CaO = CaS + FeO$$

Since the concentration of lime, CaO, is very large in comparison with the concentrations of the other reacting substances, it may be considered to be a constant; wherefore, it would follow, from the general law of chemical equilibrium, that the concentration of the ferrous sulphide in the slag is proportional to the product of the concentrations of the calcium sulphide, CaS, and the ferrous oxide, FeO.

Assuming ferrous sulphide to be distributed according to Nernst's distribution law, the concentration of the ferrous sulphide, and, therefore, of the sulphur, in the pig iron would be proportional to the product of the calcium sulphide and ferrous oxide concentrations in the slag layer, provided no other side reactions occurred.

However, there is a side reaction which must inevitably occur since ferrous oxide is not stable at high temperatures in the presence of carbon. This reaction is as follows:

$$FeO + C = CO + Fe$$

On combining the first two equations, the net effect is seen to be:

$$FeS + CaO + C = CO + Fe + CaS$$

This equation is the usual one given by most authorities to illustrate the course of the desulphurization process.

In the course of the chemical reaction represented by this equation, it is necessary that FeS diffuse from the iron into the slag and also that the CaS, which is a product of the reac-

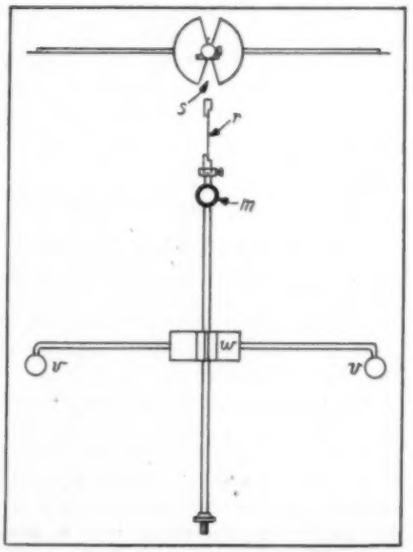


FIG. 2—UPPER PART OF SUSPENSION SYSTEM; *m*, MIRROR; *r*, STEEL SUSPENSION RIBBON; *s*, OPEN SECTOR; *w*, WEIGHT; *vv*, VANES

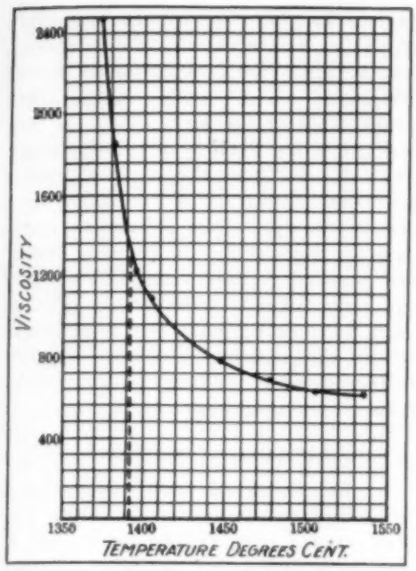


FIG. 3 — TEMPERATURE-VISCOSITY CURVE OF AN ARTIFICIAL DIOPSIDE

tion, diffuse with sufficient rapidity to prevent the reversible reaction from coming to a standstill prematurely. For this reason the desulphurization reaction is conditioned largely so far as its speed is concerned by the viscosity of the slag, and resolves itself into a reaction confined to a great extent to the boundary plane between molten iron and slag. This boundary plane exists around the molten iron globules previous to their fall to the bottom of the hearth and between the contiguous layers of iron and slag in the hearth. To what extent desulphurization is completed previous to and during the fall of the iron globules through the slag layer is not known.

If it is true that during the smelting process equilibrium is reached under normal conditions in the case of the partition of sulphur between iron and slag, then the desulphurizing power of any given slag is independent of the viscosity of the slag, as such. In such a case the distribution of the sulphur would be a function only of the composition of the iron and slag and of the temperature of the hearth. However, if equilibrium is not reached under normal conditions, there cannot be in the strict sense of the word a distribution of sulphur, since the laws of distribution refer only to equilibrium conditions. In this case, the amount of sulphur absorbed by the slag depends on the speed of the raction of desulphurization, which as has been noted above, is conditioned by the viscosity of the slag, as well as by the temperature and composition of molten iron and slag.

With the help of the temperature-viscosity data of a number of different slags, obtained by means of the method which is described in this report, the bureau of mines is undertaking research investigations to determine the following facts: (1) By determining the speed of sulphide absorption by different slags at such temperatures as to possess identical viscosities to deduce the effect due simply to differences of temperature and composition; (2) by determining the speed of sulphide absorption by same slag at different temperatures, to deduce the effect due to changes in viscosity and temperature; (3) and by determining the speed of sulphide absorption by different slags at the same temperature, to deduce the effect due to changes in slag composition and in viscosity. Also, in each case, the final conditions of equilibrium are to be determined.

This work when completed should give a clear insight into the mechanism of the desulphurization process, and should be a test of the validity of the theory of Turner and of Schafer, that the silicate of the slag acts as a comparatively inert solvent for the spinels (aluminates) which alone are capable of reacting with the sulphide sulphur in the pig iron. According to this theory a slag low in alumina should possess a relatively weak desulphurizing power; and there should exist a lower limit of alumina content below which a slag could not be made to act satisfactorily in the blast furnace.

Relation Between Composition and Softening Temperature

In the absence of any method of viscosity measurement at the extreme temperatures of the blast furnace hearth, it has been customary for investigators to obtain an idea of the softening temperature or deformation temperature of slags by means of the familiar cone tests, in which test pieces similar to Seger cones are made from the slag and the temperature noted at which these test pieces bend over, melt to a ball, or otherwise show signs of incipient fusion.

In the ceramic industries and also in determinations of the fusibility of coal ash, cone tests furnish valuable information, since in these cases the important point in view is to determine the minimum temperature at which deformation or softening occurs. If, for instance, a firebrick softens appreciably at 1600 degrees Cent., it is not a matter of technical interest to know how this brick would behave at 1800 degrees Cent., nor would a cone test give any information in regard to this question.

Mellor has defined the softening temperature concisely, as, "The softening temperature measures the temperature at which the inward surface pressure of the substance becomes greater than those intermolecular forces which hinder the molecule taking up a position of stable equilibrium-minimum surface area."

It is undoubtedly true that silicate mixtures at temperatures at or near their softening point possess a surface tension of considerable magnitude, as may be shown by the rounding off at the end of a glass rod when held in the flame of a Bunsen burner. What is observed actually is the resultant effect of decrease of viscosity and action of surface forces upon the softened body.

There is given in Table I the softening temperatures and analyses of 18 commercial slags. These determinations were made in a platinum-wire resistance furnace in an atmosphere of air, temperatures being measured by a platinum-rhodium thermocouple. The sulphur content of the slag is accordingly entirely converted to the sulphate by the oxygen of the atmosphere, and possibly a portion was volatilized. The measurements cannot, therefore, be considered as rep-

Table I

Softening Temperatures of Slags by the Cone Test

Slag Lab. No.	Percentage of SiO_2	Al_2O_3	CaO	MgO	CaS	MnO	Softening temperature, degrees Cent.
22,967	48	8	32	5	2.0	0.1	1244–1254
22,965	38	10	40	4	3.1	1.2	1262–1264
22,964	38	9	43	2	2.4	0.2	1263–1266
22,968	44	9	40	2	2.7	0.2	1279–1279
22,960	37	11	25	20	3.5	2.2	1297–1300
22,958	34	27	27	6	4.9	0.3	1342–1342
22,953	36	12	41	6	3.1	0.7	1331–1346
22,956	35	11	42	7	3.6	0.5	1352–1357
22,963	34	14	41	6	3.4	0.6	1343–1360
22,969	34	12	43	6	3.2	0.5	1358–1364
22,961	34	15	38	10	2.9	0.3	1365–1368
22,955	32	16	44	1	4.4	0.1	1356–1390
22,952	32	12	45	6	3.4	0.5	1383–1391
22,957	31	15	36	10	5.5	0.2	1388–1398
22,954	18	35	31	10	4.1	0.3	1410–1410
22,966	33	11	44	4	5.9	0.5	1425–1441
22,962	32	15	48	2	3.5	0.2	1403–1443

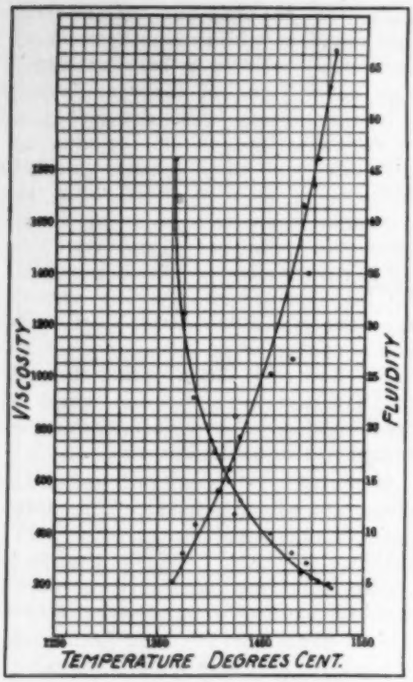


FIG. 4—RELATIONS OF TEMPERATURE TO FLUIDITY AND VISCOSITY SHOWN IN EXPERIMENTS WITH SLAG NO. 22,954

resenting entirely the conditions within the blast furnace with its atmosphere of carbon monoxide and nitrogen. The slags are arranged in the table in the order of increasing refractoriness.

While it is impossible to draw any definite conclusions as to the variation of the softening temperature with the composition from these measurements, it is at once evident that, in so far as the effect of silica is concerned, low softening temperatures are in general associated with high silica content in the slag. In regard to the effect of lime or of alumina the data in the table yield nothing conclusive.

The Influence of Eutectics

As is well known, the softening of a silicate mixture such as blast furnace slag depends upon the amount of eutectic which is formed during incipient fusion and upon the viscosity of this eutectic. It is obvious that, given a sufficient amount of this eutectic to overcome the rigidity imparted to the test piece by the unfused portion, deformation will occur even though the eutectic possesses an extremely high viscosity. This softening may require time on account of the high viscosity of the eutectic mixture, but in cone tests sufficient time is usually furnished for this slow deformation.

Reference to the work of Rankin and Wright at the geophysical laboratory on the system lime-alumina-silica, shows that the minimum ternary eutectic of this system is composed of CaO 23.25 per cent, Al_2O_3 14.75 per cent, and SiO_2 62 per cent, which melts at a temperature of 1170 degrees Cent. Further examination shows that in all cases low-melting binary or ternary eutectics in the system lime-alumina-silica correspond to a higher silica content than is usually found in blast furnace slags. Therefore, in all blast furnace slags which possess more than the usual amount of silica there is formed on incipient fusion a large amount of a low-melting eutectic, which when it attains a sufficiently low viscosity, causes the test piece to soften and deform visibly.

It follows that high-silica slags, which are known to be more viscous furnace temperatures than more basic slags, possess quite paradoxically a very low softening temperature. One might attempt to explain the high viscosity of siliceous slags in practice by claiming that such slags produce a low hearth temperature, and that the high viscosity is due to the low temperature of the slag. Whether this be true or not, the measurements which have been made in these investigations show conclusively that at all practicable hearth temperatures a siliceous slag is much more viscous than a normal slag at the same temperature.

Table II
Analyses of Slags

	Furnace No. 2, per cent	Furnace No. 3, per cent
SiO	35.18	37.60
Al_2O_3	12.08	12.46
CaO	43.73	40.80
MgO	4.23	3.66
CaS	4.21	3.65
MnO	0.39	0.55
	99.82	98.72

If, therefore, one should assume that the slags given in Table I required the same amount of superheating above the softening temperatures there given, 200 degrees Cent., for instance, no importance could be attached to subsequent deductions, because actual measurements of viscosity and temperature show that during a range of 200 degrees of superheating certain slags attain a fluidity three times as great as others.

Emphasis should be placed upon the distinction between the physical melting point and the softening temperature of silicate mixtures, which latter is often loosely referred to as the "melting point". The former refers to a temperature which is perfectly definite in the case of the majority of silicate mixtures, viz., the temperature at which the *last* crystalline phase disappears upon slowly raising the temperature of the melt. Only in the case of silica itself and certain alkaline feldspars does the physical melting point appear to be a rather uncertain point. The softening temperature may differ enormously from the physical melting temperature, nor can deductions be made simply on the basis of melting-point determinations as to the relative positions of the softening and melting points, with respect to each other.

Temperature Measurements

In the course of the investigations a number of attempts were made by the author, with the co-operation of Dr. J. K. Clement, physicist of the bureau of mines, to determine slag temperatures by means of a Holborn-Kurlbaum optical pyrometer. The conclusion reached in the course of these observations was that, due to the impossibility of obtaining a clean surface on the outflowing slag and of obtaining a slag which was entirely free from fumes, such measurements, at the best, were liable to a very large error. Accordingly a special type of platinum-rhodium thermocouple was constructed, the inner mechanism of the couple being protected by a sheath of Acheson graphite where subjected to the action of the molten slag.

For the sake of comparison, a number of simultaneous measurements of temperature by means of the optical pyrometer and thermocouple were

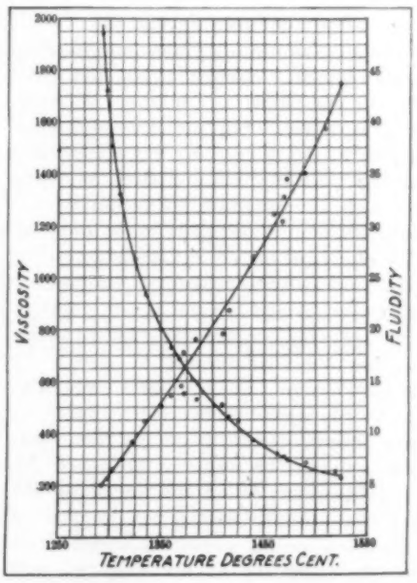


FIG. 5—RELATIONS OF TEMPERATURE TO FLUIDITY AND VISCOSITY SHOWN IN EXPERIMENTS WITH SLAG NO. 22,958

Table III

Viscosity of Typical Blast Furnace Slags

[H_2O at 20 degrees Cent. = 1]

Temperature, degrees Cent.	Viscosity of Slag, Lab. No.							
	22,954	22,962	22,958	22,963	24,016	23,663	22,960	22,968
1275	....	....	....	1400	2600	....	....	....
1300	....	....	1700	1000	1500	....	1900	....
1325	....	....	1060	820	1080	2000	1100	3000
1350	2600	....	800	680	800	740	840	1800
1375	1150	....	640	540	620	560	640	1220
1400	750	3000	510	460	500	480	510	1000
1425	540	580	420	400	420	410	440	820
1450	410	480	350	350	350	360	380	680
1475	320	415	300	310	290	300	320	580
1500	230	380	260	280	250	250	280	480
1525	160	340	225	250	230	200	240	400
1550	....	290	....	220	205	....	....	340
1575	....	....	....	....	....	....	....	310

made at two separate furnaces of a large Pittsburgh steel company.

The average temperature at flush by means of the thermocouple was equal to 1500 degrees Cent. for furnace No. 2, and 1485 degrees Cent. for furnace No. 3, with a variation in temperature at flush during the day of 108 degrees Cent. in the former case, and of 85 degrees Cent. in the second case. Both furnaces appeared to be working perfectly normally, so far as could be judged from the behavior of the slag at flush.

Table II gives the analysis of the slag from both furnaces on the day upon which the temperature readings were taken.

An examination of what Johnson calls the curve of free-running temperature shows a decided minimum at a silica content of approximately 44 per cent, this minimum free-running temperature corresponding to 2450 degrees Fahr. or 1339 degrees Cent.

The results of the investigations of the author demonstrate conclusively that, for alumina content approximately 12 per cent, the slags of minimum free-running temperature correspond with a certain degree of approximation to a silica content of 36 per cent, rather than 44 per cent.

It is of interest to note that such a silica content (36 per cent) corresponds to average blast furnace practice using coke as fuel.

Of course, in charcoal practice using high-silica slags, it is possible to work with a more viscous slag than is the case in coke practice. However, in constructing such a curve as given by Johnson, the term "free-running temperature" necessarily refers to a temperature corresponding to a definite and constant viscosity.

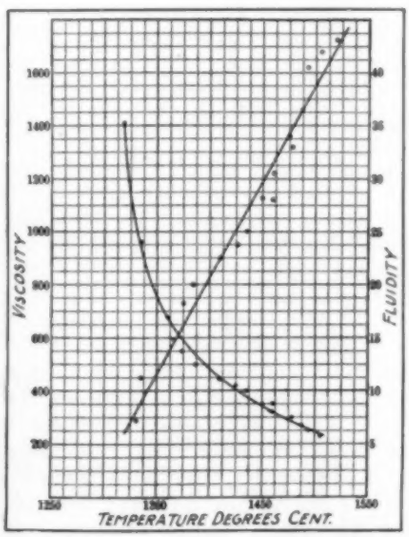


FIG. 6—RELATIONS OF TEMPERATURE TO FLUIDITY AND VISCOSITY SHOWN IN EXPERIMENTS WITH SLAG NO. 23,663

Temperature-Viscosity Relations of Snythetic Slags

The only satisfactory method of studying the temperature-viscosity relations of blast-furnace slags and the effect of the different constituents on the viscosity is the determination of such relations for a graded series of synthetic slags in which one constituent is gradually replaced by another. Such investigations are now in progress in these laboratories.

To illustrate the experimental results which are being obtained, there is shown in Fig. 1 the temperature-viscosity relations of a synthetic slag containing 48 per cent lime (curve *a*) and of a synthetic slag of the same composition except that 20 per cent of the lime has been replaced by an equal percentage by weight of magnesia.

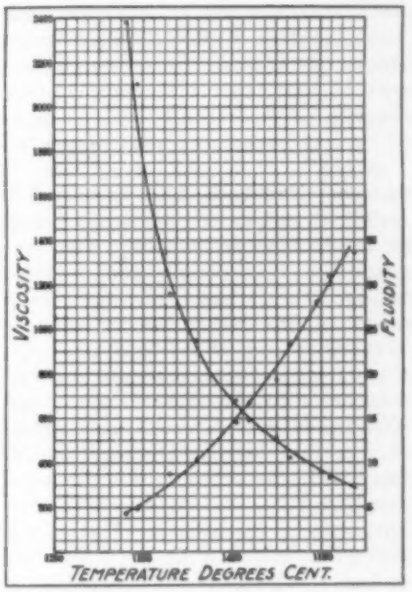


FIG. 7—RELATIONS OF TEMPERATURE TO FLUIDITY AND VISCOSITY SHOWN IN EXPERIMENTS WITH SLAG NO. 22,968

Description of Furnace and Accessories

The electric furnace used in the experiments of the author is of the granular carbon, resistance type, and is similar as regards the arrangement of resistor and supporting refractories to the one described by Jeffries.

A ¾-inch steel shaft, by means of which the cylindrical crucible containing the slag is rotated, projects up into the furnace through a stuffing box placed centrally in the base of the sheet-iron shell. The lower end of the shaft is supported on a bearing fixed to the tripod. The steel shaft extends only a short distance beyond the bottom of the furnace shell, and is bored for the reception of a slightly smaller supporting rod of Acheson graphite. This supporting rod is threaded at its upper end for the reception of the graphite slag crucible, the graphite

Table IV

Results of Analyses of Eight Slags

Lab. No.	Composition of slag, per cent												Total, per cent
	SiO_2	Al_2O_3	Fe_2O_3	FeO	Fe	TiO_2	CaO	MgO	MnO	CaS	Alkalies	Moisture	
22,954	18.30	35.30	0.00	0.47	0.05	0.58	31.24	9.69	0.35	4.07	0.50	0.02	100.57
22,962	31.54	14.79	0.00	0.07	0.22	0.29	47.65	1.80	0.21	3.56	....	0.10	100.23
22,958	33.67	26.62	0.00	0.28	0.51	0.28	26.67	6.43	0.33	4.86	....	0.12	99.77
22,963	34.27	13.78	0.00	0.07	0.28	0.56	41.30	6.39	0.55	3.35	....	0.04	100.59
24,016	35.76	*13.36	....	....	....	....	42.11	3.94	0.49	3.70	....	....	99.36
23,663	36.04	*12.10	....	....	....	....	42.04	4.03	0.35	3.92	....	....	98.48
22,960	37.18	11.46	0.00	0.31	0.11	0.52	25.33	19.58	2.21	3.51	....	0.04	100.25
22,968	43.56	9.48	0.00	0.21	0.38	0.19	40.18	2.08	0.21	2.75	0.50	0.05	99.59

*Includes Fe_2O_3.

rod being tapered at its upper end to a diameter of 3/16-inch in order to eliminate, as far as possible, conduction of heat from the crucible. The crucible possesses an inside diameter of 3/4-inch and an inside depth of 3 inches, with a thickness of wall of 1/4-inch. The bottom of the crucible is 1/2-inch thick, so that the rod may be firmly threaded into it. The supporting rod fits snugly into the hole in the axis of the steel shaft to a depth of 2½ inches, and its length between the top of the steel shaft and the bottom of the crucible is about 6 inches. In the earlier experiments with the method it was thought necessary to introduce a Marquardt porcelain rod between the crucible and the steel shaft to prevent excessive heat conduction. By using a graphite rod tapered down to a diameter of only 3/16-inch, no excessive heat conduction has been noted; and besides eliminates the undesirable experimental features of using a brittle porcelain part in the supporting system.

The normal atmosphere of the furnace is a mixture of carbon monoxide and nitrogen, corresponding to that in the hearth of the blast furnace.

Viscosity Apparatus

Acheson graphite seems to be the only refractory available for such use as that of the high-temperature viscosity measurements on blast-furnace slag. This possesses the advantages of having a very low coefficient of expansion, a relatively great mechanical strength at high temperatures, desirable working properties, and shows inappreciable alteration on being kept for long periods at high temperatures.

The action of the molten slag on the viscosity spindle immersed in it is so small that the radius of the spindle decreases only approximately 0.005 centimeter during a viscosity determination. The action of the slag is perfectly uniform over the surface of the spindle, so that the spindle may be used repeatedly, due allowance being made for the slight change in its radius.

The distance from the surface of the slag to the bottom of the steel suspension, *r*, Fig. 2, is approximately 21 inches. Such a system would not in itself be at all stable under the conditions of measurement. It was therefore necessary to place a weight of about 200 grams between the suspension ribbon and the spindle at a point just outside the furnace shell and about 4½ inches below the suspension. This weight gives stability to the system, decreases the effect of vibrations upon the mirror, and holds the spindle in its position in the slag mass. Moreover, in order to further increase the inertia of the system about its longitudinal axis and to render the system aperiodic and practically nonsusceptible to disturbing influences of short duration, the 200-gram weight, *w*, Fig. 2, is furnished with two diametrically opposite vanes, *v* and *v*, which dip into cups filled with a viscous fluid, such as castor oil, at a distance of about 4 inches from the axis of the system. The mirror deflection is measured in the usual way by means of a telescope and scale.

The entire suspension system is fixed to a rod that projects horizontally from an apparatus support, firmly fixed to a heavy table and provided with a millimeter scale for precise vertical adjustment of the apparatus. The furnace itself is first adjusted so that the steel shaft is in a vertical position, which insures the alignment of the crucible also. The point to which the suspension system is fixed is then aligned by means of a plumb bob with the axis of the shaft and crucible. In this manner the viscosity spindle is suspended centrally within the crucible.

The fluctuation of the scale reading rarely amounts to more than 1 per cent of the scale reading. It is probable that the mirror reading which is a measure of the viscosity of the slag is more precise than the reading of temperature in certain cases, although not so accurate.

Measurement of Temperature

The temperature of the slag was measured by means of an optical pyrometer of the Holborn-Kurlbaum type. The pyrometer is sighted directly upon the surface of the rotating slag through an open sector in the 200-gram weight, as shown in Fig. 2.

As a check on the black-body conditions of the furnace used in the viscosity measurements, a sample of artificial diopside, $CaO.MgO.2SiO_2$, was prepared, and its temperature-viscosity relations determined in the same manner as adopted in the case of slags. This compound has a physical melting point at 1392 degrees Cent. and is converted, coincidently with its melting, from a crystalline substance to a fairly fluid liquid.

The results of these measurements are given in Fig. 3. The viscosity curve bends quite sharply upward in the neighborhood of the theoretical melting point, the observed difference of about 20 degrees Cent. being probably due to the fact that the artificial diopside did not have exactly the theoretically correct composition. Analysis of the artificial diopside gave the following composition: CaO 25.98 per cent, MgO 19.48 per cent, SiO_2 55.08 per cent. The correct composition is: CaO 25.84 per cent, MgO 18.58 per cent, SiO_2 55.58 per cent.

Manipulation of Apparatus

The method of using the apparatus is as follows: 175 grams of slag are placed in the graphite crucible. This quantity of slag, when ground to 100 mesh, approximately fills the crucible. Although the height of the crucible internally is 3 inches the slag after having been melted and cooled forms a cylinder only about 1⅝ inches in length. The crucible, containing the slag, is properly placed, and the upper removable part of the furnace is fixed in position. The crucible is then rotated and the furnace is heated at such a rate that at the end of about 1½ hours the slag reaches a temperature of 1200 degrees Cent. The rate of heating is then decreased in order that the large mass of slag may acquire the temperature of the heating tube and diminish the lag effect. When the slag has become sufficiently fluid, as determined by the several tentative lowerings of the viscosity spindle, the suspension system is carefully lowered until the

Table V

Viscosity Values With Rising and Falling Temperatures

[Results obtained in experiments with slag designated Lab. No. 22,958]

Rising temperature		Falling temperature*			
Temperature, degrees Cent.	Viscosity	Temperature, degrees Cent.	Viscosity	Temperature, degrees Cent.	Viscosity
1382	605	1292	1940	1382	611
1410	513	1297	1707	1387	524
1415	460	1302	1505	1425	446
1425	442	1312	1319	1440	375
....	...	1322	1074	1466	323
1463	320	1337	922	1470	304
....	...	1350	805	1488	285
1473	291	1359	728	1525	228
1510	255	1368	689	....	...

*Results are given in reverse order, for easy comparison with results under "Rising Temperature."

viscosity spindle rests on the bottom of the crucible. During this operation the rotation of the crucible is stopped in order to avoid the possibility of breaking the graphite spindle while it is being introduced into the viscous slag. The spindle is then raised exactly 0.5-centimeter above the bottom of the crucible, the adjustment being made by means of the scale in the apparatus support.

After the suspension system has been lowered and the depth of the viscosity spindle adjusted, the temperature of the slag is slowly raised at a rate of 2 to 5 degrees Cent. per minute, the temperature and scale deflection being noted at approximately regular intervals. When the highest temperature desired, usually 1500 to 1600 degrees Cent., is reached, the heating current is so adjusted that the furnace cools at approximately the same rate that it was heated. Readings of deflection and temperature are taken, until the maximum deflection (corresponding to a viscosity of 2000 to 3000) is reached. The spindle is then raised out of the slag before the latter becomes hard enough to prevent withdrawal.

Results of Viscosity Measurements

The results of viscosity measurements on eight different commercial slag samples are given in Table III for the temperature range 1275 to 1575 degrees Cent. The compositions of the slags are shown by the results of chemical analyses given in Table IV.

Temperature-viscosity curves were plotted, as shown in Figs. 4 to 7, for slags Nos. 22,954, 22,958, 23,663 and 22,968. The curves closely approximate in form a rectangular hyperbola. These figures contain all the experimentally determined points obtained in the heating and cooling of the sample, so that a smooth curve drawn through all the points must represent very closely the ideal conditions desired, the deviations tending to neutralize one another.

The temperature-fluidity curves are also given in Figs. 4 to 7 for the four slags mentioned above. The values are calculated by means of the familiar relation, Fluidity = 1/Viscosity. As was to have been expected from the general shape of the viscosity curves, the curves representing fluidity at various temperatures approximate in form a straight line. The actual experimental data obtained in the case of slag No. 22,958 are given in Table V, which contains results obtained with rising and falling temperatures.

Duplicate determinations on separate samples of the same slag gave results which agreed well within the known errors of measurement.

Appearance of Slag Melts

When cold the slag was easily removed from the graphite crucible by pressing on the bottom of the melt through the hole into which the graphite crucible support is threaded. The slag on cooling shrinks away from the graphite crucible wall sufficiently to prevent objectionable binding and sticking. The melt as taken from the crucible is cylindrical with an upper surface which is almost flat, as the viscosity at the moment when the spindle was withdrawn was not great enough to prevent the slag from flowing into the space previously occupied by the graphite spindle.

The measurements here described give for the first time an accurate idea of the actual magnitude of the viscosity of blast furnace slags in units which are capable of a physical interpretation, as well as of the rate of change of viscosity of different slags with temperature over a wide range of temperature and viscosity.

If an average slag temperature of 1500 degrees Cent. is assumed, an examination of the data given in Table III discloses the fact that the viscosity of the normal blast furnace slag as it flows from the cinder notch approximates 250 (H_2O at 20 degrees Cent. = 1). This represents a viscosity less than that of castor oil at room temperature but greater than that of olive oil.

The viscosity of the eight slags, considered in Table III, at a temperature of 1500 degrees Cent. varied from 230 to 480. A synthetic slag upon which measurements have been recently made showed a viscosity of 770 at 1500 degrees Cent., this slag containing 48 per cent silica; while reference to Fig. 3 shows that at this temperature the artificial diopside containing 55 per cent silica had a viscosity of 640. The effect of silica in such amounts upon the viscosity of silicates at temperatures above their melting points is thus clearly demonstrated, the increase in viscosity over that of normal slags being marked even in the case of diopside which contains no alumina and a high percentage of magnesia.

It would seem that even such high percentages of alumina as are present in the slag designated Lab. No. 22,954, although causing a high initial softening temperature, do not have a very noticeable effect in increasing the viscosity of the melt at high temperatures. This peculiar property of alumina, which may be a quite general characteristic, is probably associated in some manner with the uncertainty of its action within the furnace.

Comparison of Viscosity Measurements With Cone Tests

It was thought a matter of interest to compare the results of viscosity measurements with cone tests made with corresponding slags. The cone tests were made, as has been previously described under conditions which converted the sulphide content of the slag to the state of the sulphate. For this reason the comparison is not a strict one. In Table VI is given in relative order the softening temperature of six slags and their viscosities at 1400, 1450 and 1500 degrees Cent.

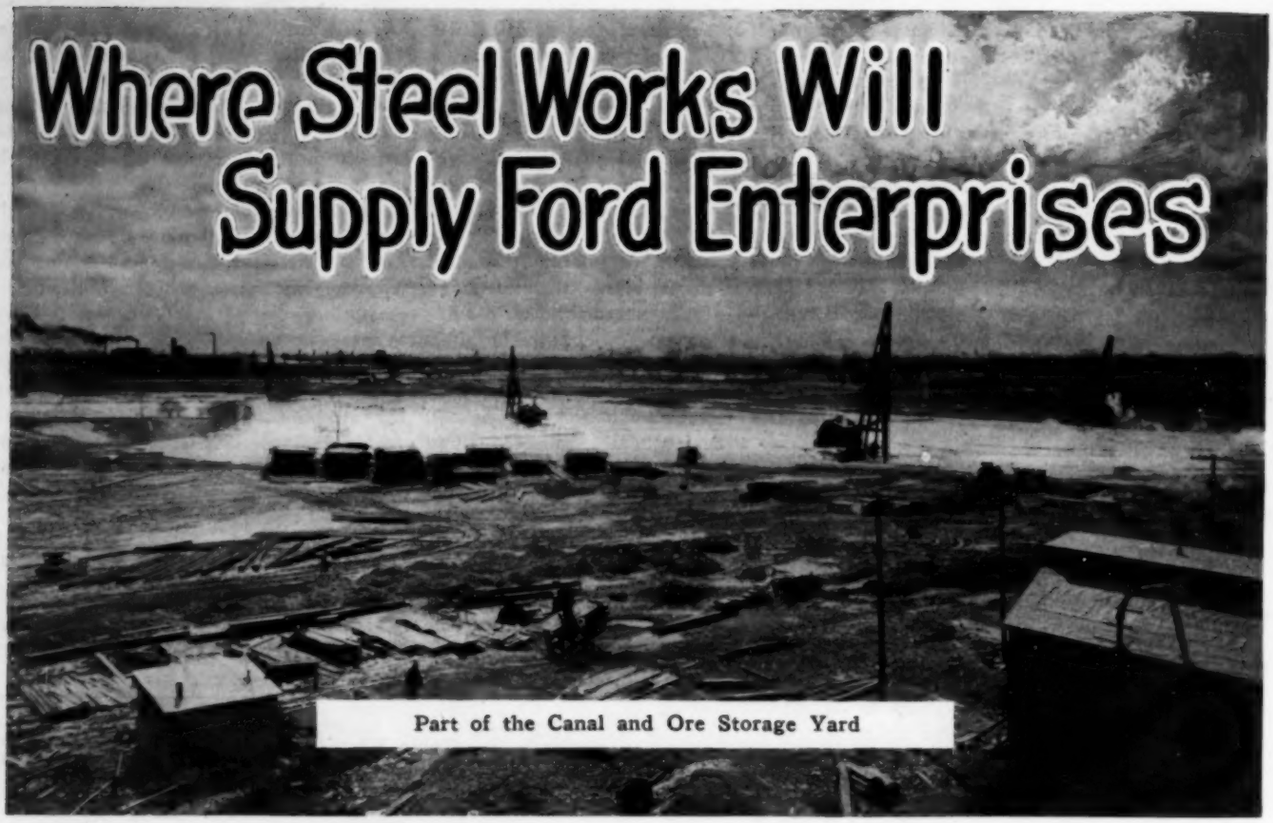
Table VI

Cone Measurements of Softening Temperatures of Slags

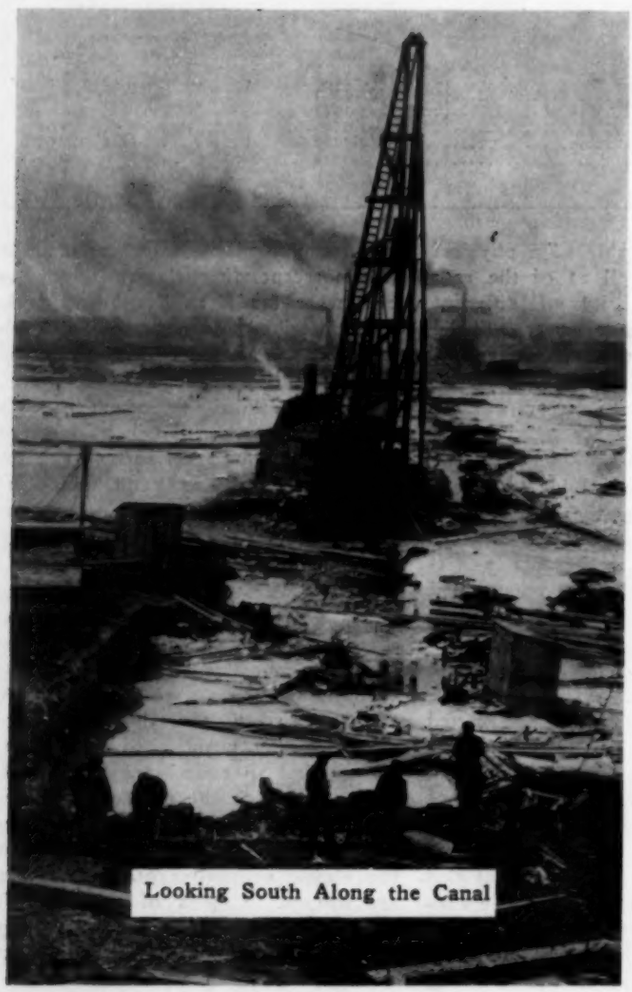
Slab Lab. No.	Softening temperature, degrees Cent.	Viscosity at 1400 degrees Cent.	Viscosity at 1450 degrees Cent.	Viscosity at 1500 degrees Cent.
22,968	1279–1279	1000	680	480
22,960	1297–1300	510	380	280
22,958	1342–1342	510	350	260
22,963	1343–1360	460	350	280
22,954	1410–1410	750	410	230
22,962	1403–1443	3000	480	380

Bulletin No. 99 of the University of Illinois Engineering Experiment Station contains the results of a series of experiments on the collapse of short thin tubes, made by Prof. A. P. Carman of the department of physics. The purpose of these tests was to find an equation by the application of which the pressure required to collapse a tube can be calculated when the dimensions of the tube and the elastic properties of the material are known. Copies of this bulletin may be obtained gratis by addressing the Engineering Experiment Station, Urbana, Ill.

Where Steel Works Will Supply Ford Enterprises



Part of the Canal and Ore Storage Yard



Looking South Along the Canal

SUB-FOUNDATION work has been completed and the construction of the steel works to supply the varied industries of the Ford Motor Co., at Detroit, is taking tangible form. An idea of the magnitude of this undertaking may be gained from the accompanying illustrations. The very conception of a steel plant to handle and develop raw material from its native state and to prepare an element through the initial processes to the complete finished product is unique. True, many industries are devoting attention in this direction, but no plant is in existence at the present time which performs all the operations which convert crude ore into a finished machine.

The principles of progressive manufacture involving a steady forward movement of the product through the various operations of manufacture has governed the layout of the new steel plant. The ore will be handled by cars from the docks into the storage yard or to the furnaces. The direct furnace ore will be delivered to a bin system which will serve the skip hoists to the blast furnaces. Iron will be tapped from the blast furnaces into ladles and transferred to the open-hearth furnaces in a molten state. From the open-hearths, the metal will be conveyed directly to the foundry. From this point conveyors will come into operation and remove the castings to the cleaning department and from thence to the machine shops.

The plant site includes over 4000 acres on the River Rouge, just outside the city limits of Detroit. Four blast furnaces are to be constructed. These will require extensive ore-handling equipment, and facilities for the production of coke to prevent delays incident to a shortage such as existed last winter. The first of the permanent construction which has been completed is the ore unloader shown at the top of the opposite page. This equipment was built

Ore Unloader Nears Completion

Foundations for Storage Yard

by the Wellman - Seaver - Morgan Co., Cleveland. A duplicate unloader is now under construction. Extensive piling has been necessary to secure a solid sub-foundation, owing to the character of the sub-soil. Even the storage yards have been started upon a base of piles, which were driven four feet apart over the entire area. These storage yards and the docks will be of reinforced concrete construction, and much of the foundation work already has been completed, as will be noted from the illustration shown at the top of this page. About 700 cubic yards of gravel is transported by boats every day for the concrete work. The yards will be divided into two section which distribute the load of the ore uniformly over the entire area. The retaining walls of reinforced concrete are being constructed in sections by means of the movable form and pouring units shown at the bottom of the page. The concrete is mixed with an excess of water bringing it to a fiuid state. It is then pumped through 6-inch pipes under a high pressure into the forms. This system produces an exceptionally dense and practically waterproof mass, and also provides an economical means of delivering the mix to the top of the wall forms shown. Concrete also is being used in the construction of embankments for the canal which will run through the entire property dividing the blast furnace and shipyard sites from the tractor plant. This canal will carry the waters of the Roulo creek and will empty into the River Rouge about a mile from the point where the latter joins the Detroit river. The ore unloaders and storage yards are along the bank and a depth of 20 feet will permit the lake ore carriers to come up for unloading. A turning basin for lake freighters will be constructed under government supervision at the junction of the canal with the River Rouge. This basin will be a semi-circular bay dredged to a depth of 25 feet, and with an area of 989,100 square feet. Incoming freighters will turn in this basin and back up the canal to the storage yards. The dredging operations are being carried on by suction dredges and the fill is distributed in a semifluid state through pressure pipes to raise the level of surrounding land. The steel plant proper will cover about 350 acres and will include seven buildings, four blast furnaces and four storage yards. Two of these furnaces will be completed this year. Among the buildings comprising this group are an administration building, a laboratory, power house, machine shop, foundry, and by-products plant. The two ore storage yards previously mentioned and which will provide an ore reserve, will be about 500 x 1530 feet. Two coal yards of the same size also will be built. The by - product coke plant will produce furnace and foundry coke.

Movable Form for Concrete Walls

Build Huge Crane for Shipyard Use

Mammoth Hoisting Unit Now Under Construction Will Have Lifting Capacity of 392 Net Tons—Unusual Size of This Shipbuilding Crane Necessitated Radical Changes in Design

SUCCESSFUL prosecution of modern warfare requires almost day to day progress in military science. Racing alongside of development in the military arts comes the advance in mechanical science. Probably the most graphic illustration of this necessary and parallel development of these sciences is the stride made in the last four years in aviation. Military reasons necessitated this development while progress in mechanical knowledge made it possible.

A long list of less absorbing but equally important developments can be traced in the mechanical arts during the past four years, most of which owe their growth directly to war's needs. One illustration of this is the steady increase in the sizes and weights of the guns employed both in land and naval warfare. The huge gun with which the Germans have been bombarding Paris is the most striking illustration of this growth but it marks merely a great forward step in the steady march toward larger guns. With this enlargement has come a great increase in weight and, as a corollary, heavier hoisting units. In naval construction particularly, the problem of handling these huge guns during their installation or while undergoing repairs, has led to rapid progress in the design of cranes of great capacity.

Work is now proceeding at Bedford, O., in the plant of the McMyler-Interstate Co., on the construction of the largest crane of its type ever built in the world. This crane will have a hoisting capacity of 392 net tons, the crane itself towering 230 feet above the ground. The crane will be installed at the Brooklyn navy yard primarily for handling heavy guns into and out of warships.

The design of this crane necessitated a departure from the established lines and the completed machine will differ radically from any hoisting unit previously built.

The crane is of the stationary, electrically operated, hammerhead type. The huge size necessary to secure a lifting capacity of 350 gross tons or 392 net tons, is revealed graphically in the smaller of the accompanying illustrations. The crane is shown in comparison with similar cranes of smaller size and also ranged alongside a modern office building. The maximum height of the new crane from the base to the top of the machinery house, is 230 feet. The Rockefeller building, at Cleveland, illustrated in the drawing, is 16 stories high, or practically 200 feet. The maximum load of 392 net tons carried by the new navy crane at a 115-foot radius, compares with a maximum of 5 tons carried by a small shipbuilding crane at 95-foot radius, or with a 120-ton weight carried by a shipbuilding crane of that capacity, at a maximum radius of 60 feet. The drawing also shows on the same scale, the ordinary locomotive type crane as well as a modern freight locomotive, three of which could be picked up at one time by the new navy crane.

In constructing this crane, approximately 3340 net tons of steel will be required. This includes 2500 tons of structural steel, 375 tons of machinery 35 tons of electrical apparatus, 100 tons of miscellaneous parts and 330 tons in the counterweight.

In calling for bids for this crane, the navy department had under consideration the construction of three machines of the same size and design. Up to this time only one has been contracted for.

The crane will be installed at the Brooklyn navy yard, the contract calling for completion by June 1, 1919. The machine will be erected for the first time upon its permanent site at the navy yard. This site is a pier which gives only a 20-foot clearance at each side of the crane. Present plans call for the use of a 275-foot derrick boom in handling the erection work.

The arrangement of the crane is shown clearly in the general plan. The dock is 100 feet wide giving a clearance of 20 feet on each side of the 60-foot portal. The illustration shows the manner in which the crane will command slips on both sides of the pier.

The crane will have a capacity for hoisting and slewing a load of 350 gross tons at a maximum of 115 feet, and a load of 50 tons at a maximum radius of 190 feet. The main hoist is divided into two duplicate units, each of 175 gross tons capacity. Special provision has been made for coupling these units when the full capacity of the huge crane is desired.

The crane is a specially designed type. The steel tower mounted on the main portal, converges at the top and carries a roller bearing which supports the boom. In addition to this weight, the bearing carries a revolving steel frame structure which is guided by rollers carried in a path just above the main portal. This design was chosen to insure stability and to facilitate control while slewing. The revolving structure carries none of the weight of the boom. The roller bearing will be furnished by the Hydraulic Tool Co., Philadelphia.

A machinery house is carried at the rear of the boom, a cross section of this house being shown in the larger illustration. The number and size of the electric units used in operating the crane necessitated provision for a traveling crane in this machinery house to handle the machinery while being installed or repaired. This small crane is of the electric, overhead traveling type and has a capacity of 35 tons. The crane runway extends beyond the machinery house to permit hoisting the machinery direct from the ground. An electrically operated vertical sliding door weighing 10 tons is provided in the rear of the machinery house.

A study of the principal dimensions of the main crane gives a clearer index to its immense size. The distance from the top of the foundation to the bottom of the main and auxiliary hoist hooks in their highest positions is 141 feet. The maximum radius from the center of rotation of the main hoist is 115 feet, with a minimum radius of 41 feet. The maximum radius from the center of rotation of the auxiliary hoist is 190 feet with a minimum radius of 41 feet. The clearance under the portal is 25 feet. The clearance between the portal legs is 50 feet. The main hoist blocks and the auxiliary hoist block will descend 29 feet below the dock level. The maximum radius of the main hoists, with a maximum load, is 115 feet when operated either separately or jointly. The auxiliary hoist has a maximum radius of 190 feet with a maximum load.

The operating speeds call for the rapid handling of loads. Each main

hoist, with a maximum load, operating either independently or jointly will have a speed of 2.5 feet per minute. With no load, each main hoist will have a speed of 10 feet per minute. The auxiliary main hoist with a maximum load will have a speed of 12 feet per minute and with no load, 30 feet per minute. The speed of the trolley travel of each main hoist with a maximum load will be 12 feet per minute, and with no load, 100 feet per minute. The speed of the trolley travel of the auxiliary hoist with a maximum load will be 100 feet per minute, and with no load, 150 feet per minute.

The operating mechanism consists of an electric motor driving through properly connected gears and shaftings, four vertical pinions meshing with a circular rack. The transmission mechanism is interposed with three compensating gears so as to compensate the duty on the four slewing pinions. The controller is of the magnetic type.

Two separate hoisting units are provided in duplicate. The design calls for a double lead from each hoisting drum to the trolley in order to reduce the rope strains by one-half as compared with the single lead. Each main cable will be equalized on a sheave at the outward end of the jib.

A mill-type motor of 87 horsepower will be used for each hoisting unit. The hoisting drums are 10 feet in diameter and 14 feet 4 inches long. The drums are built up in sections from steel castings, the face of the drums being machine scored.

In order to operate the two main hoists in unison so as to insure equal hoisting speed when hoisting loads in excess of 175 tons the maximum capacity of each individual hoist—one of the intermediate shafts on each hoist is arranged for coupling so that the two motors drive through these coupled shafts. Change gears are provided on each hoist to permit variation in the speed of hoisting.

The first intermediate shaft on each hoist is equipped with a brake, 54 inches in diameter and with a 10-inch face. The object of this brake is to provide mechanical means of braking in addition to the electric brake. The mechanical brake will be used in emergencies.

The main hoist racking or traversing mechanism for the main hoist trolley which travels back and forth on the jib, consists of two duplicate rope drives, each unit operating one of the 175-ton hoists. A mill type motor of 27½ horsepower is used for each racking unit. The racking drums are 48 inches in diameter with a 54-inch space. The intermediate shafts of the racking or traversing mechanism are arranged to couple together to insure trolley movements in unison when hoisting maximum loads.

Change gears for securing speed changes are provided on the traversing mechanism. The motors have solenoid brakes.

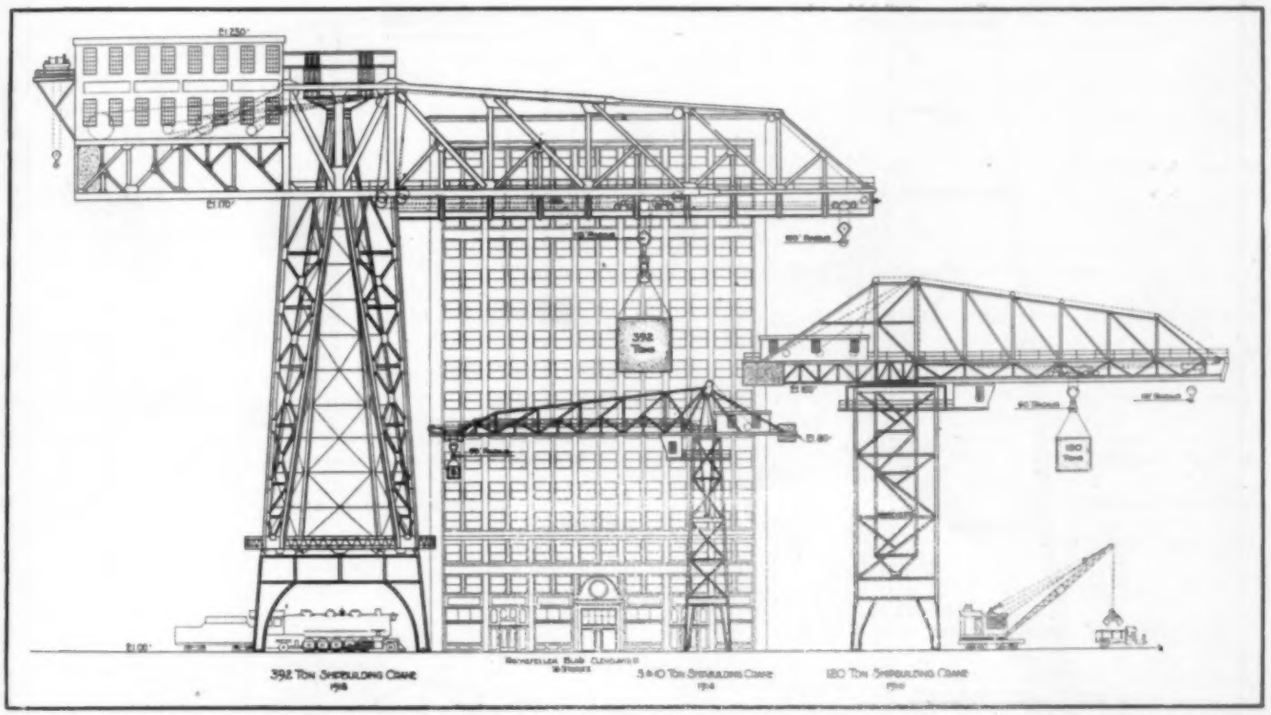
On the auxiliary hoist, double rope lead from the hoisting drum to the trolley. A mill type hoist motor of 87 horsepower is used. The hoisting drum on the auxiliary hoist is 84 inches in diameter with a 102-inch face, machine scored. A mechanical emergency brake is provided as well as a solenoid brake on the motor. The variations in hoisting speed with a maximum load and with no load is obtained by means of an electric speed control.

The auxiliary hoist racking or traversing mechanism follows the general design of that employed with the main hoist. A mill type motor of 27½ horsepower is used. The drum is cast iron, 36 inches in diameter and 54-inch face. The motor is provided with a solenoid brake. The required speed variations are electrically controlled.

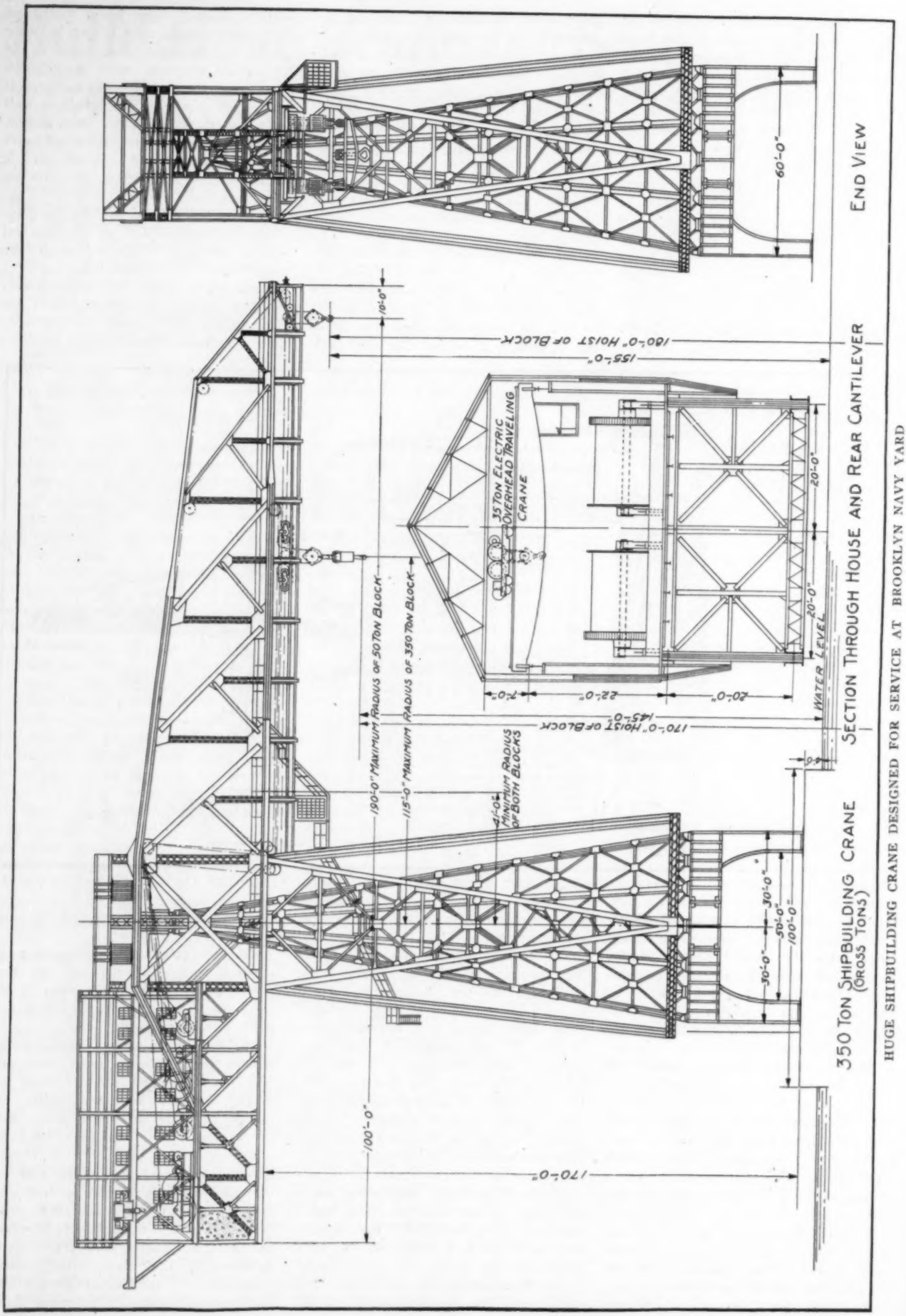
Slewing mechanism comprises an annular rack mounted on the rear of the roller path at the base of the revolving structure. The rack is cast steel with cast teeth.

The motor equipment includes two motors for the main hoist; two motors for the main hoist trolley; one motor for the auxiliary hoist; one motor for the auxiliary hoist trolley; three motors for the overhead crane operating over the machinery floor, one motor for slewing and one for operating the vertical sliding door in the rear of the machinery house.

The auxiliary hoist trolley operates the full length of the travel independent of the main hoist trolleys. The trackway for the auxiliary trolley is located between the main hoist



GRAPHIC COMPARISON OF SHIPBUILDING CRANE WITH MODERN BUILDING AND WITH TYPICAL HOISTING UNITS



HUGE SHIPBUILDING CRANE DESIGNED FOR SERVICE AT BROOKLYN NAVY YARD

trolley trackways. The main hoist trolley is mounted on eight rolled steel double flanged wheels, 30 inches in diameter. The wheels are mounted in pairs in equalizer trucks. The auxiliary hoist trolley is mounted on four rolled steel, double-flanged wheels, 24 inches in diameter.

Each main hoist will be reeved for two 8-parts hoist lines. These lines will be 1⅝ inches in diameter. Each hoist line is a single cable, each end of which is attached to opposite sides of the hoist drum. The auxiliary hoist will be reeved for two 4-parts line, 1⅜ inches in diameter, and the main hoist trolley reeved for single line operation, the lines being 1⅝ inches in diameter. The reeving of this line is in effect that of an endless cable, one end of the cable being attached to the drum and the opposite end to the inboard side of the trolley. The other cable is connected to the opposite end of the drum for winding in the opposite direction. The auxiliary hoist trolley will be reeved in the same way as the main hoist trolley, a ⅞-inch diameter line being employed.

An equalizing bar fitted with suitable shackle is arranged for connecting with the two main hoist fall blocks permitting the lifting of the maximum joint loads of the two main hoists.

Four 500-watt, 110-volt searchlights with reflectors are provided on the main trusses for illuminating the working area covered by the crane. A 500-watt flood light will be used in the operator's house.

The crane for handling machinery parts is carried on a crane runway in the machinery house where the operating mechanism is mounted. From center to center of the crane runway rails will be 43 feet. This runway will carry a 35-ton capacity, 3-motor electrically operated traveling overhead crane.

All operating levers for controlling the motions of the crane are located in the operator's cab in front and to one side of the revolving structure. The clutches for coupling the main hoist mechanism, and the two main hoist racking mechanisms, are operated by the attendant in the machinery house. Electric bell signals in the operator's cab, machinery house and at the base of the crane are to be employed for controlling the operations of the crane.

To Electrify Mine

The Scrub Oak mine of the Wharton Steel Co., which is located about a mile distant from the company's blast furnace plant at Wharton, N. J., is to be provided with electric power by the New Jersey Electric Lighting & Power Co. It is expected to utilize about 2000 horsepower. The ore vein which now is being worked is 27 feet wide, 650 feet deep and about one mile long. It is estimated that the mine can be worked at the present rate for at least 10 years. The ore averages about 45 per cent in metallic content in its natural state and 65 per cent after being concentrated. The ore is brought to the Wharton Steel Co.'s blast furnaces over a railroad owned by the company.

Steel Corporation's Order Book Again Drops

A further reduction in the unfilled tonnage of the United States Steel Corp. was made in March, according to the regular monthly report recently issued. Orders going over at the end of the month aggregated 9,056,404 tons, a decline of 232,049 tons, or 2.49 per cent. These orders, as shown in the report, involved the smallest tonnage since Oct. 31, 1917, at which time 9,009,675 tons were on the books. The largest amount left over in recent months was on April 30, 1917, when the unfilled orders aggregated 12,183,063 tons. The reduction last month is attributed chiefly to the further improvement in shipping facilities. Following is a comparative statement:

Date	Total	Change, tonnage	Change, per cent
Mar. 31, 1918..	9,009,675	232,049—	2.49—
Feb. 28, 1918..	9,288,453	189,400—	1.99—
Jan. 31, 1918..	9,477,853	96,135+	1.02+
Dec. 31, 1917..	9,381,718	484,612+	5.44+
Nov. 30, 1917..	8,897,106	112,569—	1.24—
Oct. 31, 1917..	9,009,675	823,802—	8.37—
Sep. 30, 1917..	9,833,477	573,572—	5.51—
Aug. 31, 1917..	10,407,049	433,115—	4.16—
July 31, 1917..	10,844,164	539,123—	4.74—
June 30, 1917..	11,383,287	503,304—	4.24—
May 31, 1917..	11,886,591	296,492—	2.43—
Apr. 30, 1917..	12,183,083	471,439+	4.02+
Mar. 31, 1917..	11,711,644	134,947+	1.16+
Feb. 28, 1917..	11,576,697	102,643+	0.90+
Jan. 31, 1917..	11,474,054	73,232—	0.64—
Dec. 31, 1916..	11,547,286	488,744+	4.43+
Nov. 30, 1916..	11,058,542	1,043,282+	10.41+
Oct. 31, 1916..	10,015,260	492,676+	5.18+
Sep. 30, 1916..	9,522,584	137,133—	1.42—
Aug. 31, 1916..	9,660,357	66,765+	.69+
July 31, 1916..	9,593,592	46,866—	0.48—
June 30, 1916..	9,640,458	297,340—	3.09—
May 31, 1916..	9,937,798	108,247+	1.11+
Apr. 30, 1916..	9,829,551	498,550+	5.34+

War Increases Building

War activity in New Jersey received considerable impetus in the four months preceding March 1, according to the records of the structural bureau of the department of labor at Trenton, N. J. Chemicals are being produced in eight new buildings; munitions, of which New Jersey already produced a heavy percentage, will be made in 14 plants instead of one; in connection with shipbuilding, plans for no less than 10 buildings have been filed. Forge shops have been expanded; new boiler shops, iron foundries and wire works have been erected; increased wireless facilities have been provided and many buildings erected for the manufacture of foodstuffs, handling of meats and by-products and several mills have been built to turn out silks, woolens, etc.

Elects New Members

Sixteen new members were added to the roll of the American Iron & Steel institute at the last directors' meeting. These are as follows:

Archer M. Campbell, Glamorgan Pipe & Foundry Co., Lynchburg, Va.

Francis H. Hardy, South Eastern Iron Corp., Chicago.

John J. Howard, Lavino Furnace Co., Lebanon, Pa.

William H. Hulick, Warren Foundry & Machine Co., New York.

E. George Lavino, E. J. Lavino Co., Philadelphia.

William J. McCurdy, Manufacturers Iron & Steel Co., Catasauqua, Pa.

Theodore E. Moritz, American Steel Foundries, Chicago.

W. W. Pettis, Cincinnati.

George W. Ramey, Atlantic Steel Co., Atlanta, Ga.

Charles J. Stark, THE IRON TRADE REVIEW, Cleveland.

James H. Walsh, Illinois Steel Co., South Chicago, Ill.

Charles H. Williams, American Iron Products Co., Inc., New York.

M. H. Broderick, Muncie, Ind.

George Frank Konold, Warren Tool & Forge Co., Warren, O.

William Sigler Jones, Vanadium-Alloys Steel Co., Latrobe, Pa.

George Coffin Warren, Fulton Steel Co., New York.

Discuss Core Problems

The monthly meeting of the New England Foundrymen's association at the Exchange club, Boston, on Wednesday evening, April 10, was largely attended and developed into one of the most interesting ever held. C. S. Cleland, sales manager of the Black Products Co., New York City, spoke on "Cores and Corebinders". A brisk discussion of the merits of compound and oil binders followed the talk, to which, in addition to Mr. Cleland, Mr. Alborn, of the Builders Iron Foundry, Providence, T. R. Scott, of Brown & Sharpe, Providence; Dennis Eagan, New England agent of the Pridmore Molding Machine Co., Mr. Harrington and Mr. Kehoe, of the Hunt, Spiller Co., and Werner G. Smith, of the Werner G. Smith Co., Cleveland, contributed. The discussion indicated that for some purposes oil binders are best while for others the compound or dry binder is to be preferred. President George P. Aborn, of the association, presided.

Calls For Industrial Peace

President Wilson Accepts Report of National War Labor Board and Reappoints Members to Carry Out Principles Proposed

WASHINGTON, April 16.—Appeal was made last week by the President, in formally accepting the report of the national war labor board appointed by Secretary Wilson, in which he urged "upon all employers and employes within the United States the necessity of utilizing the means and methods thus provided for the adjustment of all industrial disputes" and requesting "during the pendency of mediation or arbitration through the said means and methods there shall be no discontinuance of industrial operations which would result in curtailment of the production of war necessities."

This statement by the President was in a proclamation formally accepting the report of the board which was submitted March 29. He immediately renamed the board to the work suggested and outlined in the report, the principles and methods to be those contained in the report which had for its keynote the slogan, "There should be no strikes or lockouts during the war."

The members of the board are: Former president William H. Taft representing the public on behalf of the employers; Frank P. Walsh representing the public on behalf of the employes; L. A. Osborn, New York, vice president of the Westinghouse Electric & Mfg. Co.; H. B. Worden, Newark, N. J., president of the Submarine Boat Corp.; W. H. Van Dervoort, East Moline, Ill., president of the National Metal Trades association; L. F. Loree, New York, president of the Delaware & Hudson railroad; and C. Edwin Michael, Roanoke, Va., president of the Virginia Bridge & Iron Co., representing employers; Frank J. Hayes, Indianapolis, president of the United Mine Workers; William L. Hutcheson, Indianapolis, president of the Brotherhood of Carpenters; Victor Olander, Chicago, representative of the Seamen's Union; T. A. Ricket, Chicago, president of the United Garment Workers; and William H. Johnson, Washington, D. C., president of the Machinists' International Union, representing employes.

Fix Mill Day Rate

Under the recent 15 per cent wage increase, effective April 15, the day labor rate in the Youngstown, O., district will be 38 cents an hour, according to an announcement by the Carnegie Steel Co. Since independent companies have always followed the Steel corporation's lead in such advances, it is anticipated this will be the universal rate. When the increase was announced, it was a question whether the rate would be 37½ or 38 cents, since a 15 per cent increase on 33 cents would make the rate a fraction below 38 cents. Other wage rates are being adjusted accordingly, machinists receiving around $7.50 per day.

Request Increased Wages

Fully 5000 men are affected by the recent request of the machinists' union for a 20 per cent wage increase effective May 6, made to 38 manufacturers of Springfield, West Springfield and Chicopee Falls. Nearly all of these plants are engaged in subcontract work on government war orders and the present average wage rate for machinists is about 45 cents an hour. Toolmakers are paid between 40 and 50 cents. That no thought of a strike exists is the statement made by officials of the union who claim that rates paid in that territory are lower than in other eastern sections. They are anxious to arrange conferences with manufacturers and in these conciliatory overtures, believe they are actuated by patriotic motives.

Will Erect Dwellings

Negotiations are being carried on between the Clairton Land Co., Pittsburgh, a subsidiary of the Carnegie Steel Co., and the Worthington Detchon Co., for the purchase of 11 blocks of building lots. It is proposed to erect modern brick dwellings on the site and sell them on an easy payment plan to workers who will be employed at the by-product coke plant of the Carnegie Steel Co. at Clairton, Pa. The by-product plant with the Union railroad connections and the gas lines to the other towns along the river represent an expenditure of approximately $40,000,000. The plant will produce coke and gas for most of the plants in the Monongahela valley.

Labor Notes

With a demand for a blanket increase of 25 per cent in wages, 500 workmen at the implement plant of B. F. Avery & Sons, Louisville, Ky., including blacksmiths, molders, piece workers, machine operators, polishers, foremen, trip hammer operators, etc., have gone on a strike. Vice president William Black states that some additional men have been secured and with certain loyal workmen several departments have been operated about one-half time.

The Oakville Co., Watertown, Conn., manufacturer of pins, will build 20 reinforced concrete 2-story industrial houses for its employes. The contract has been awarded the Aberthaw Construction Co., Boston.

Approximately 1000 Canadian girls now are at work upon Liberty motors at the plant of the Union Switch & Signal Co., Swissvale, Pa., subsidiary of the Westinghouse Airbrake Co., Wilmerding, Pa. It is expected that the monthly production will be 600 motors.

The Emerson-Brantingham Co., Chicago, has granted a 10 per cent wage increase to the Rockford plant. This last affects about 2000 men and carries with it a war bonus of 1 to 5 per cent for each six months of service. Some such action was made necessary by the attractive high wages offered for skilled work at Camp Grant.

The Alan Wood Iron & Steel Co. has announced a 15 per cent increase in the wages of the employes at its Swedeland and Ivy Rock, Pa., plants. This is the third increase in six months, making the wages of the company's employes about 40 per cent higher than they were a year ago.

In an opinion handed down to the Pennsylvania state department of labor and industry, Deputy Attorney General Collins holds that the state industrial board of Pennsylvania may determine the minimum age at which minors can be employed in foundries, and that if it sees fit, this body may fix 18 years as such a limit.

To increase their employes' efficiency and earning capacity, the Gilbert & Barker Mfg. Co., West Springfield, Mass., now grants a 5 per cent bonus to all who report on time every day. To come one minute late means the forfeiture of one week's bonus. Since government contracts furnish the company's work at present, speed is the chief requirement.

Five hundred New Haven, Conn., school teachers have agreed to enter the factories during the summer vacation if necessary to maintain a high level of war-time production. This is one of the developments of the recent campaign to increase the number of women in industry. The registration was made under the direction of the Connecticut state council of defense.

Business Pledges Its Might to War

Chicago Meeting of Chamber of Commerce of United States Dedicated to More Effective Utilization of Nation's Resources—Progress of Government Work to Date Shown—Improved Plan of Centralized Authority Outlined

TIDINGS of close co-operation of business with the government in the country's greatest present industry, war, and pledges of fullest support in every department—this was the keynote of the sixth annual meeting of the Chamber of Commerce of the United States held in Chicago April 10 to 12. No hesitating note was heard, no criticism of past mistakes; only the fullest assurances of aid and complete confidence in the outcome were expressed.

Significant information as to the preparatory progress of the nation's war development was given, with facts showing that results of this work will be apparent in large degree within the next few months. Broadly considered, the meeting presented the needs of the government, expressed by representatives of the various departments, the progress that has been made and the plans yet under way, all to the same end, of concentrating the country's resources most effectively upon the one vast enterprise.

Greetings were given by the Earl of Reading, British ambassador extraordinary and plenipotentiary on special mission, from England and the allies, by Josephus Daniels, secretary of the navy, and by Franklin K. Lane, secretary of the interior, the latter representing President Wilson. The program suffered some curtailmeht of an important character in the enforced absence of E. N. Hurley, chairman of the United States shipping board, and Charles Piez, vice president and general manager of the Emergency Fleet corporation, both of whom were detained in Washington by imperative business.

Four general subjects deemed of the greatest importance in the effort to place the resources of the nation behind the war were taken up in separate conferences. Shipping easily took precedence as the necessary link to make available and useful the results of the others, yet dependent in some measure on the others, as the warp and woof of all efforts are woven into the vast fabric of accomplishment. Government organization in relation to business in war, finance and railroads and highway transportation are the remaining three general subjects.

Business' Part in Getting Needed Ships

THAT tremendous efforts are being made to provide an increasing number of ships, with the warning that this is the crucial factor in our contribution to the war, that the government is obtaining an organization to work smoothly with production and distribution of materials and that financing and transportation are being made effective were the messages borne by government representatives and others.

"The most urgent problem before American business men today is this: What can business men do through their organizations to help get ships through to insure victory—and to get them in time?" This was the keynote of the shipping situation, expressed by Edward A. Filene, chairman of the war shipping committee of the chamber. He continued: "In my judgment the American people are more responsible for delays in ship construction than is the government. I have no desire to gloss over any responsibility that may rest on the government, but it should be clearly understood that even though the government does its work perfectly, so far as its administrative functions go, still there will be delays until the people in general, and we business men in particular, accept and discharge our full share of the responsibility."

George J. Baldwin, senior vice president of the American International Corp. and chairman of the American International Shipbuilding Corp., stated the problem and the solution as it is being worked out.

"Large wooden vessels are experimental and have so far not been very satisfactory. Concrete ships are an untried experiment. Steel vessels built on well-tried principles but by new methods are our only sure and definite reliance and it is on the construction of these that we must concentrate our efforts.

"The problem then presented was the production of the largest possible number of first class ships in the shortest possible time. They must be cargo ships of ample carrying capacity and satisfactory speed and in answer to this problem three entirely new ideas were carefully worked out:

"First, the designing of a vessel radically simplified and standardized, not as a whole but in each of its parts, a vessel that could be speedily constructed in large numbers, eliminating every possible variation in size and shape of material and the parts of which could be built in the manufacturing plants now existing to avoid building new ones.

"Second, the mobilization throughout the country of industries germane in any way to ship production, bridge and structural steel industry, builders of engines and boilers, steel fabricators, forges, machine shops and factories capable of producing any equipment going into a ship from propeller shaft to anchor chain.

"Third, the production of vessels in large numbers, every one of exactly the same construction, thus permitting the use of factory methods in which America is pre-eminent. The new shipyard was to become the assembling floor of a colossal ship factory whose

machinery was already operating in a thousand cities, whose employes were the entire body of American labor and whose conveyor belts were the American railways."

Mr. Baldwin then described the making of drawings for parts and equipment and the distribution to shops all over the nation, the assembling of the parts and the value of quantity production as an efficient plan that removes much of the usual cost and delay. Problems now presenting are an adequate supply of steel and workmen, both of which are being solved.

Patriotic labor was paid a tribute by Dr. Charles A. Eaton, head of the national service department of the Emergency Fleet corporation. He set forth the difficulties met by shipbuilders and the government in the lack of shipyards and experienced labor. "They had to have more ships than was ever demanded in the history of the world at any time and to have them quickly. Consequently our government organized the greatest shipbuilding program since the dawn of time and put it into practice with men without experience.

"Now, with reference to labor. Some months ago we were face to face with a situation in the shipyards that was somewhat difficult, if not actually appalling. But all the men needed was to be shown and I have been amazed and delighted at the splendid response they have given to our appeal. We have gone to and fro among the shipyards, preaching the gospel of consecration, of patriotism and of dedication to this great service and you would be surprised at the magnificent response. My staff and myself have spoken to around a million men and have yet to receive the first discourtesy and I have seen the tide rising until I tell you that when this war is over, the men of the shipyards will furnish one of the strongest forces in our civilization for democracy.

Pinnacle of Production Soon

"We have got to stand up and take our medicine for several months more, until we have the equipment for producing the ships and are ready to produce, and then, suddenly, when the last moment seems to have come, that we can hold out under these conditions, you will see break out from our shipyards a tremendous output of ships the like of which never has been seen in the world."

Meyer Bloomfield, head of the industrial service department of the Emergency Fleet corporation, spoke on the reduction of ship-labor turnover. He has just returned from a tour of Pacific coast shipyards and found ships are being built fast and well. The most inspiring fact he noted was the splendid spirit of labor in the coast yards. Labor trouble there has been largely eliminated. Frank and honest co-operation between managers and men is doing it. Both have come to realize they are working for themselves, to win the war and slacking is a thing of the past.

A most interesting description of what has been done to place an entire city at the disposal of the workers to get best results was told by James T. Hutchings, general manager and vice president of the Rochester Railway & Light Co. The Rochester plan is a wide development of the idea of giving the workers every facility for comfort and speed. It was the suggestion of the mayor and his wisdom is well evidenced by results. Women have been utilized in the production of munitions to a point where it is no longer a problem. First the problem was to find the right ones for the several places. Now it is fitting them for any job that presents. The problem now is to obtain skilled men to operate the tools shortly to be ready for use. The plan is to draft them equally from all Rochester industries to fill the gun and shell factory. They will not all be taken at once but in relays, so that other industries will not be crippled. It is hard for a plant to give up its best men but Rochester has decided to do that for the general good.

War Calls to Country's Best Ability

WADDILL CATCHINGS, chairman of the war service executive committee of the chamber, presided over the section devoted to the organization of the government with relation to business in the war. He said: "The war has brought great industrial problems to the government and to industry. In their solution there is needed the best judgment and training, the soundest thought that business men have and the organization of industry during the war has for is prime purpose the focusing of the best ability and experience of business men in the solution of these problems for on their solution hangs the winning of the war.

"To a great degree there is needed at this time the experience and training of the business man who is accustomed to getting results, who is familiar with the facilities and equipment of the country. It is needed both on the part of the government and of industry, because there are great problems in procuring war materials and in maintaining industry in strong condition. Business men, therefore, have a strong responsibility to make effective use at this time for the common good and in the interest of all of the training and experience they have acquired in the past.

"Business exists for profit but in this time of the national emergency when business men are seeking to serve the country and not themselves it is necessary to create a condition under which they will not be open to suspicion of self-interest or of profit-seeking in this public service.

"You must apply your knowledge and experience to bringing about a condition under which there will be no profit interest in war. We all know of cases where important business men of the greatest experience, whose services were urgently needed, have been found unavailable because of the distrust which would exist throughout the country at the appointment of such men in business to handle industrial problems. It is with the gradual realization of the splendid underlying spirit of business men that they are being appointed from time to time to positions of the highest importance in connection with these industrial problems.

"It is not alone during the war we have this work to do. There are great problems in connection with these industries which have been supplying huge quantities of materials. What is to be done with their output after the war? There are great problems with respect to the return of millions of men to industry. What is to be done with them after the war? The English government has been studying this matter for some time. They have created a ministry of reconstruction. No time must be lost in starting similar work in this country."

One of the most important papers from a definite and constructive point of view was presented by George M. Peek, industrial representative of the war industries board of the council of national defense. He showed a diagram of the organization of the

war industries board under the chairmanship of B. M. Baruch. In this the effort has been to obtain the most complete co-operation between the various purchasing departments of the government and the various industries of the country. His outline of the plan is as follows:

"The fundamental necessity for intelligent action by the board is a knowledge of the government's requirements as far in advance as possible, and in order to acquire this knowledge there has been formed a requirements division of the war industries board, into which the various departments of the government and the allies purchasing commission bring their requirements as soon as they are known.

"These requirements are briefly considered by the requirements division and passed directly to the commodity sections of the war industries board interested in the particular requirements. These sections are created to handle raw materials and finished products of which there is an unusual or threatened shortage or the price and production of which should be controlled, in order that the United States government, its allies and the civilian population may be protected as far as possible.

"When the requirements deal with the commodity listed where a shortage exists, or where an allocation seems desirable, but for which no regular section has been established, such requirements will be considered by a special section erected for such purpose by the requirements division and this special section shall perform the same functions as are performed ordinarily by the regular commodity section.

"Each section chief is charged with the responsibility of collecting from the several departments of the government, from the manufacturers and from committees representing them, and especially from the war service committees created under the supervision of the chamber of commerce of the United States, and from any and all other reliable and available sources —information concerning the production of the particular commodity or commodities with which his section has to deal, including available supplies, new sources of supply, methods for increasing production, etc.

"Each commodity section shall consider market conditions pertaining to the material or commodity over which it has jurisdiction, and shall, where deemed advisable, recommend purchase plans to the several purchasing departments. Where it becomes necessary to control orders in whole or in part by means of allotments, this section will determine the allotment of materials, commodities and facilities to the several departments of the government and its allies, and also the extent to which manufacturers and others, whether serving the civilian population or engaged in the manufacture of war supplies, shall be rationed. The various government purchasing agencies will continue to make the contracts and place orders as heretofore."

Reconstruction in foreign trading was treated by Dr. Frank W. Taussig, chairman of the United States tariff board.

Finance of War Raises Big Problems

A SESSION was devoted to finance in the war with special attention to the trade acceptance. Charles A. Hinsch, president of the American Bankers' association, presided. Lewis E. Pierson, of the Irving National bank, New York, opened the discussion. He outlined the workings of this new form of commercial paper and its advantages, as well as the efforts that have been made to obtain its larger use as an aid to business. Some of these have been effective and some have failed. Some objections have been overcome and more prejudice still remains to be removed before ideal conditions exist.

"We must realize," said Mr. Pierson, "that however well-intentioned the average banker may be toward the trade acceptance, he, with other properly cautious business men, will not assume unduly concerning conditions the future may bring and will not

Business is Awakening to the Pressing Problems of the War

A Record in Rivets

The following telegram was read at the shipping meeting Thursday by Meyer Bloomfield, head of industrial service department of Emergency Fleet corporation, Baltimore, Md., April 9, 1918.:

Holden A. Evans, Chicago:

New York papers Sunday made much of what was called a record rivet drive at Port Newark yards, stating that Eckstein with extra heater boy and extra passer boy drove 1967 rivets in nine hours. We believe we have the fastest riveting gangs in the world and stand ready to prove it. On April 9, Charles Schock and his gang with extra heater boy and extra passer boy drove in nine hours 2720 three-quarter snap rivets in floors of 8800 tonners. This report has been verified by Fleet Corporation representative.

The Baltimore Dry Dock & Shipbuilding Co.

Must Bridge Seas

By Edward A. Filene

If

THERE is one chance in a hundred that we shall be short of ships in the next six months, then—

All our country's resources in men;
All our country's resources in material;
All our country's resources in aiding—

Must go first of all to helping turn out more ships.

Because

SHIPS are the bridge over which every soldier we train, every gun we make, every bit of food we save, every supply needed to win the war must go before they can be used. If the bridge is broken, if there are so few ships that there are gaps in the bridge, then we cannot win.

Americanizing Aliens

Forty-three dialects are used in conversation by our foreign-born groups.

Nearly 50 per cent of the more than 13,000,000 foreign-born persons are males of voting age.

Only four out of every 1000 attend school to learn our language.

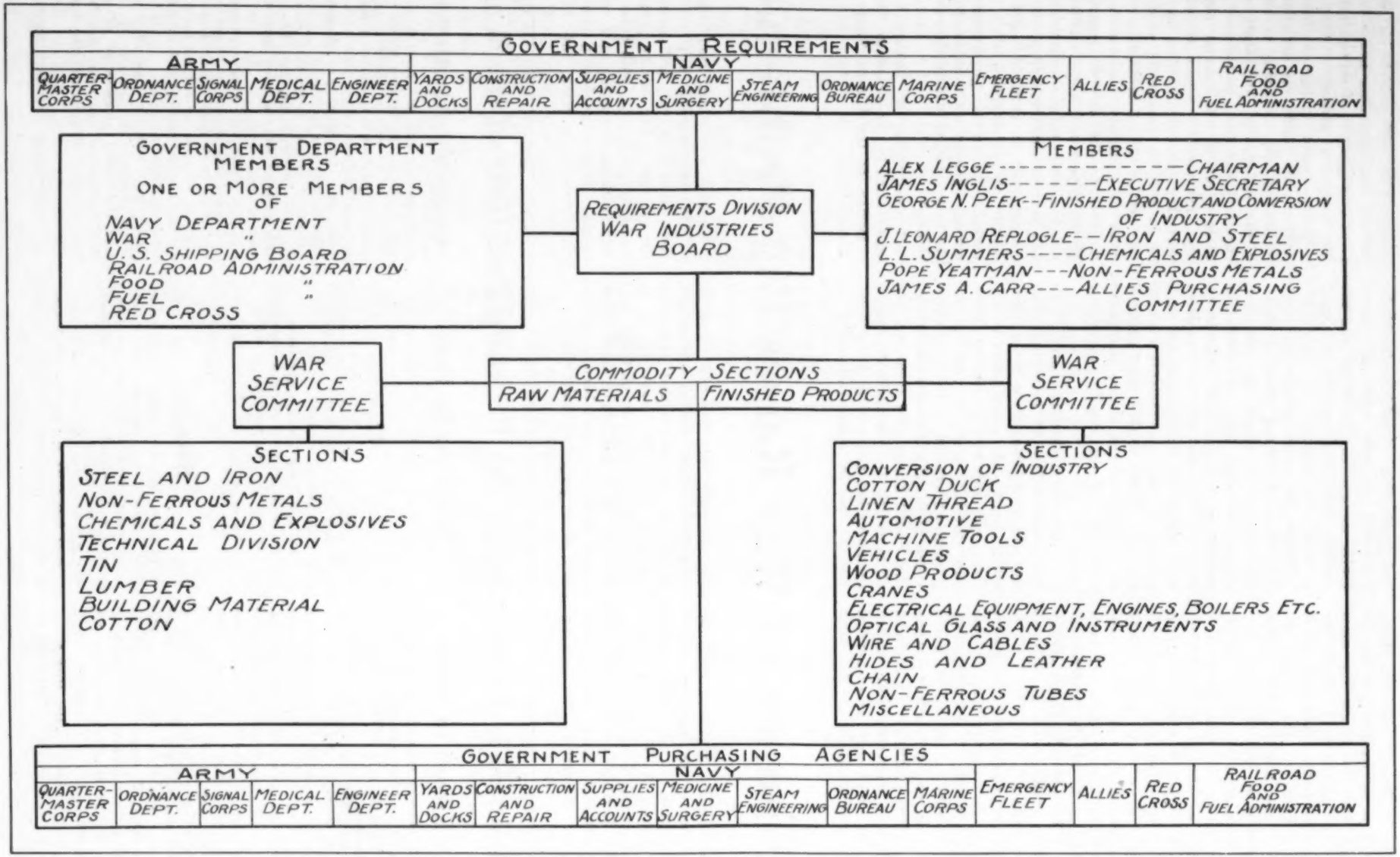
One-third of our foreign-born population, or nearly 5,000,000, were born in Germany or in countries allied with Germany.

That our basic war industries depend to a considerable degree on foreign-born persons for their labor supply, most of whom do not speak or read our language and to whom the acid test of loyalty has not been applied.

Our foreign-born are organized in societies throughout the country, to promote their racial solidarity or the political autonomy of their native lands and their first interests are not always for America.

—Immigration Committee Report.

Knowledge of Government's Needs Basis of New War Organization



Revised plan of meeting tremendous war requirements through war industries board was outlined for the first time publicly by George W. Peek, industrial representative of the board before the chamber of commerce meeting at Chicago. The accompanying chart shows how the war industries board through its various sections effectively acts as intermediary between regular government departments and general industry, co-ordinating and adjusting all demands to conditions of production and supply.

seriously modify the working plans or facilities of his bank until the reason for so doing becomes a tangible one. This attitude of undue caution also finds expression in this question: 'What are the great industries of the country doing in this connection—oil, steel, tobacco, rubber and the like?' Nothing at all, probably, continuing to do business as in the past, on a cash basis, discounting their bills and not worrying in the least about the question until their own need for commercial credit presents itself as an important business problem.

"When that time comes these industries will meet and solve that problem as they have solved other problems which have come to them in their business operations. The fact that they have risen to the position of great industries justifies the assumption that neither the trade acceptance method nor any other method possessing substantial merit will escape their attention. These industries have been so well provided with cash as to remove from their operations the problem of utilizing their own credit. In advance of the time when it will be needed to meet demands of war, these great industries are studying the trade acceptance in a way to prove conclusively they fully appreciate its merits for general purposes."

Lake Yards Set Record in Rapid Shipbuilding

SHIPBUILDING on the Great Lakes is now one of the country's largest industries. Facts brought out at the convention of the Chamber of Commerce of the United States at Chicago last week reveal more clearly than is generally appreciated the importance of the work which lake shipyards are now doing. The important facts regarding shipbuilding on the Great Lakes are summarized below.

The lake territory is now the ninth district of the shipping board, being the largest in point of territory.

When the district was created on Aug. 24, 1917, *the yards had under contract* 102 *ships,* 98 *being for ocean service. All but two of these* 98 *vessels were of canal size, about* 3400 *tons deadweight capacity. The two exceptions were of* 5500 *tons deadweight capacity and were cut in two and assembled at Montreal. All contracts were requisitioned by the Emergency Fleet corporation, three ships later being released to lake owners.*

Of the 98 *ships,* 27 *reached the ocean before ice stopped operations at Montreal, Dec.* 3. *A bitter fight with ice in the lower St. Lawrence canals and river was waged before the boats reached open water.*

Work has been rushed all winter. By May 1, *when navigation along the St. Lawrence will open, at least* 35 *ships completed during the winter will be ready to enter ocean trade. Of these,* 20 *ships are defensively armed.*

While this new construction was under way the usual winter overhaul and repair of the enormous iron ore fleet of the lakes has been carried on, these repairs being unusually heavy this year.

At the present time, the Emergency Fleet corporation has under construction or contract in the lake district 297 *cargo ships, of which about* 130 *must be completed and delivered between May* 1 *and Dec.* 1, 1918—*two ships every three days. All of the contracts must be completed before Dec.* 1, 1919.

The average tonnage of these lake ships has been increased somewhat and now stands at about 3700 *tons deadweight. The value of all of the ships is about* $200,000,000.

If all of these new ships were placed end to end, the fleet would extend about 14½ *miles. The total deadweight or cargo capacity, including fuel, would be more than* 1,100,000 *gross tons.*

In the lake district are seven shipbuilding companies operating 13 *yards, all building steel ships. Another yard is building one wooden ship and two new yards just beginning operations have contracts for a number of large seagoing tugs.*

In all lake yards at one time, 64 *canal-size cargo ships can be laid down. With normal conditions of material supply, these yards could now deliver more than* 200 *ships a year.*

The present building program of the Emergency Fleet corporation on the Great Lakes calls for 400,000 *tons of ship steel; about* 30,000 *tons of boiler steel; and about* 80,000 *tons of miscellaneous castings, forgings, pipe, plates, shapes and sheets.*

In actual deliveries the lake district has steadily been ahead of schedule. In February, for instance, 27 *per cent of all of the ships actually delivered in the United States were delivered in the lake district alone. Every ship was completed either on time or ahead of schedule—in some cases several months before the contract date.*

Last fall the shipping board requisitioned 16 *ships which had to be cut in two before being taken to the Atlantic, and also five old ships of canal size. These latter were all bulk freighters. Of the* 16 *larger ships, four were bulk freighters,* 11 *were package freighters and one, the* MINNESOTA, *was a passenger and package freighter.*

The work of getting these boats to the Atlantic was carried on in the face of great difficulties. The early and unusually severe winter blocked the work not only during the joining of the severed halves of the ships but in their journey down the St. Lawrence river.

The problem of removing these ships to salt water was taken up late in August, the first vessel being requisitioned in the middle of September. The work was speeded up and the last of the ships, after being cut in two, left Buffalo on Nov. 16.

A small American shipbuilding plant was built at Montreal, Que., other vessels being rejoined at Quebec and the bulk of the ships being designed for putting together afloat. The stern of one ship sank in Lake Ontario, but was refloated and joined to its bow at Montreal. The last ship after battling the ice in the St. Lawrence river for many days, reached the ocean on Jan. 13.

Pacific Coast Plants at Top Speed

San Francisco District Turning Out Great Tonnage of Steel Ships—Concrete Steamer Being Completed—Los Angeles Another Active Center—Local Iron and Steel Market Reflects Uncertainty

(Staff Correspondence)

SAN FRANCISCO, Cal., April 11.—Increased government requirements for men and materials have resulted in the practical elimination of unemployment in this district and in important advances in wages. The greatest factor contributing to this result is shipbuilding which is proceeding upon a scale that seems vast when measured by any standard other than the critically vital need for vessels to transport troops, food and war materials. In the vicinity of San Francisco steel construction is predominant. Of 106 vessels for which contracts have been, or are about to be closed, only 12 call for wooden vessels. In southern California, however, there is a larger proportion of wooden construction under way. According to the latest available figures, one-third of the total tonnage launched or under construction in the Los Angeles harbor district was of the wooden types.

A South Carolina shipbuilding company estimated that their output should average 25 tons per man. Under conditions of forced development, it is thought that 20 tons per man would be a more accurate estimate at the Pacific coast yards. With this as a basis, government agencies are endeavoring to develop a systematic and dependable method of estimation so that a poll of the trades of the operatives employed, would determine the number of men needed to secure a desired output.

Although the government expects the Pacific coast section to turn out not less than 30 per cent of all ships required, this vicinity is far ahead of its schedule, according to officials of the Emergency Fleet corporation's office here. The volume of construction at San Francisco and other California yards is shown by the following:

	No.	Tonnage	Cost
Steel vessels for which contracts have been closed.	73	700,000	$105,000,000
Steel vessels for which contracts are about to be closed	21	150,000	30,000,000
Wooden vessels for which contracts have been closed	12	50,000	6,000,000
Total	106	900,000	$141,000,000

In addition it is estimated that there are United States warships costing over $200,000,000 also under construction at Pacific coast yards.

With government orders at hand for 10 steel steamers of 9500 tons each, construction of the Pacific Coast Shipbuilding Co.'s plant on the upper Suisun bay is being rapidly rushed to completion. An extensive spur track system connecting the various portions of the 247-acre plant with the three railroads which traverse the company's property is nearly completed. Excavation work is 75 per cent done. A 400-foot machine shop and the plate shop were recently finished. Machinery was installed in the latter and tested two months and three days after ground had been broken for its construction. Work on the launching ways and the 700-foot fitting-out wharf will soon be completed.

The 5000-ton, reinforced concrete steamer FAITH was successfully launched near San Francisco on March 14. This experimental concrete ship was built at a cost of $125 per ton compared with the government price of $210 per ton for steel ships and in a period of four months as compared with a period of from six and a half to nine months for steel vessels of similar tonnage. A plant for building steel ships of the same size would cost $1,000,000, as against $75,000 for concrete construction. Considerable pressure is being brought to bear to secure a capacity order of 50 concrete vessels from the government for the San Francisco Shipbuilding Co. which built the FAITH, but no decisive action is anticipated until the vessel completes her trial trip to Honolulu and return.

The Alameda plant of the Union Iron Works, with facilities for fabricating four vessels at once, will be tied up with contracts with the federal government for months to come. An 11,700-ton freighter was launched from the yards recently and another of like size will leave the ways in the middle of April. An average of 600 men are employed daily on each vessel under construction.

In southern California, the Pacific Electric Co.'s construction of new lines, or the improvement of existing service conditions, are being deferred until after the war. The necessity for carrying out these deferred improvements later is expected to assist in the readjustment of labor to peace conditions by providing many opportunities for labor for men now either in the army or engaged in war occupations. This announced policy is not to be permitted to interfere with the development of the shipbuilding industry.

The most recent figures available on ship construction in the Los Angeles district are:

	No.	Tonnage	Cost
Steel vessels launched and under construction..	24	84,600	
Wooden vessels launched and under construction..	8	28,000	
Total	32	112,600	$34,500,000

Government contracts awarded the shipyards in that district for submarines, two of which have been launched, are estimated at $2,730,000. Of the six shipbuilding plants, four are using steel construction. It is estimated that 8500 men are employed.

The newly incorporated Southwestern Shipbuilding Co. is about to begin the construction of a plant on the east side of the main Los Angeles harbor channel and at the southern end of Terminal island. Each of the 10 steel ships to be built will have a capacity of 8800 tons. It is understood that the plant will be fully as large as that of the Los Angeles Shipbuilding & Drydock Co. and that an investment of $1,000,000 will be made the first year. Marco H. Hellman is reported to be virtually the leading spirit in the project, together with the Western Pipe & Steel Co., of San Francisco. The latter company has contracts from the government for 18 steel vessels to be built at its plant in the north.

Another shipbuilding industry was added to the Los Angeles harbor district recently when the harbor commission granted permission to the National Engineering Co. to utilize a municipal pier at Wilmington for fitting wooden ships with engines and boilers for the government. Four vessels are to be fitted at once and others will be received as rapidly as they can be turned out in the northern shipyards. About 1700 men will be employed.

Officials of the Emergency Fleet corporation are attempting to adjust labor conditions in the Los Angeles district and see that the shipyard owners meet the wage scale established by the federal wage adjustment board. Conferences are being held at which the workers and owners are represented. A summary discharge of 30 boilermak-

ers recently from the Craig shipbuilding plant at Long Beach led to dissension with labor union officials.

War has given so great an impetus to chromite mining that 18 men and firms are now operating, constructing or preparing to build concentrating mills to treat the California ore. Asia Minor and Africa, the former sources of the ore, have been cut off from this country by the lack of ocean carriers. When was was declared, State Mineralogist Fletcher Hamilton directed a survey to locate all deposits within the state. The price was increased with the shortage and the value of the state's production in 1917 was well over $1,000,000. The industry is now advancing at a still greater pace and inferior ores are being treated in concentration mills to replace the exhausted supplies of higher grades.

So far as the Pacific coast states are concerned, the mining of manganese is mainly an emergency measure. As a result of the war production has risen from nothing in 1913 to 13,404 tons in 1916. There has been an enormous increase since that time. The difficulties in promoting manganese production in California lie in the small size of many of the deposits and their broad distribution. There are numerous bodies that would yield from one to a hundred tons, many that contain from 100 to 1000 tons and a moderate number containing up to 10,000 tons or over. There is some agitation for the organization of the industry by the government as a war-emergency measure to increase the total output.

The steel market in the vicinity of San Francisco is in an uncertain condition owing to the postponement of much construction classified as non-essential to the successful prosecution of the war. The mills' capacities are based on about 50 per cent certainty. This condition is further complicated by the delay in the issuance of export licenses, causing congestion and uncertainty in rollings. Mixed conditions of transportation further complicate the export situation. Many inquiries as to capacity and facilities are being received by the local mills in connection with work indirectly related to war orders, but shopping and price soliciting on the part of those holding war contracts is said to be delaying matters. The labor situation remains cloudy due to isolated agitation rather than general dissatisfaction. Government prices prevail generally on steel products and the premium for prompt delivery is small. First grade scrap is selling at $37.50; carwheels at $40.

Northwest Builds Ships at Record Rate

(Staff Correspondence.)

SEATTLE, April 11.—The outstanding feature of northwest industry is the tonnage of ships, both steel and wood, that is under contract. Contracts have been awarded by the shipping board for 78 wooden ships of 318,000 tonnage and 61 steel ships of 492,000 tonnage in Oregon, or a total of 139 ships of 810,800; to Washington yards have been awarded contracts for 81 wooden vessels of 291,650 tons and 85 steel ships of 728,100 tons, a total of 166 ships of 1,035,660 tons. The total tonnage of ships launched during the first quarter of 1918 for Oregon, Washington and British Columbia aggregated a total in deadweight tons of 290,600. Of this, Washington launched 149,700, Oregon 107,300 and British Columbia 33,700 tons. Segregating these vessels as to steel and wood, Washington launched in steel ships 111,800 tons, wood 37,900 tons; Oregon, steel 74,200, wood 33,000 tons; British Columbia, steel 17,600 tons, wood 16,100 tons. The northwest during the month of March turned out 46 per cent of the vessels constructed for the United States government turning over 10 of the 21 vessels delivered to the shipping board during the month. Of the 10 ships delivered, Seattle constructed five 8800-ton vessels and one of 7500 tons, while the Columbia river section of the eighth shipping board district delivered two 8800-ton and two 3500-ton steel ships. It is probable that northwest plants will deliver five more 8800-ton vessels during April and two of 7500 tons capacity. The Skinner & Eddy Corp., Seattle, leads in these deliveries with three 8800-ton vessels; Ames Shipbuilding & Drydock Co., Seattle, is second in amount of tonnage with two 8800-ton vessels, and the Albina Engineering & Shipbuilding Co., of Portland, contributed two steel ships of 3500 tons each.

Caulkers Supply Inadequate

Industry promises to keep going at a good rate of speed, although there are occasional jars which disturb the surface of things. The caulkers' union was the head and front of one of these disturbances in the Seattle district recently. There were not enough caulkers to supply the demand and apprentices were not allowed. Consequently wages mounted until men were receiving from $12 to $14 per day, and it became necessary for employers to take action. Taking counsel among themselves and the government stepping in, the Macy or government scale of $7.20 a day was adopted. The workers are proceeding under this scale and apprentices are now being employed.

Seattle is the center of industrial activity in Washington, and the contract shops there employ about 5000 men. Practically every foundry and machine shop is assisting in the government shipbuilding program, but they are paying much in excess of the government award for wages in the shipyards. The contract shops recently adopted a wage scale of $6.66 for molders on the 8-hour-day basis for 65 per cent of the molders, and others can receive increases over that up to $7.25. The Macy award, which applies to the shipyards, now calls for $5.77 a day. There is a shortage of molders at Seattle, and at least 100 molders and coremakers could be placed at the present time. There is also a shortage of skilled mechanics and an acute shortage of coppersmiths.

The foundries of the Puget Sound district are finding the coke situation considerably improved and the probability of any of them being compelled to shut down on account of shortage is remote, although shipments from the east are not entirely satisfactory. The local fields of Wilkeson and Carbonado are being heavily drawn upon and two plants at Tacoma are getting their supplies from the Crows Nest field in British Columbia. Enough is coming through from the east to enable the foundries to secure the desired results by having a plentiful supply of the domestic output.

Increased freight rates have not as yet added to the market price of No. 1 pig iron, which holds as it has for some time at $50. An increase in freight rates has brought the price of southern No. 2 foundry up to $45.68. The freight rate now is $12.68 per gross ton. The market is not very strong. Tank plates in carload lots from the fabricating shops based on the government price of $3.25, Pittsburgh, are selling at $4.65 per 100 pounds in the Seattle market with four to six weeks' delivery from the mill, and are hard to get. Structural shapes from stock, Pittsburgh base, $4.50, are selling at $5.40. Cast iron pipe is $64 a ton, which includes $19 freight from Pittsburgh, and the market is very weak. On account of the

high prices prevailing, municipalities have been using large amounts of wood pipe. The only recent sale recorded in the section was at Spokane, Wash., where a sale of 175 tons of 6-inch pipe, the lowest offer on which was $67.60, was made to the city. Copper tubes are used in large quantities by the shipyards and the price on Puget sound is 49c, or 37c base, Baltimore.

In the matter of steel bars for export, the price is very firm. Considerable tonnage is being contracted for export through northwest ports each month, particularly from Seattle. These are going mostly to Japan. Prices have gone up due largely to increased freight rates, taking effect the middle of March, and now run from 3.95c to 4.05c on steel bars, Seattle, for export. One local mill has orders for several thousand tons for export placed at 3.95c to 4c.

Export Shipments Fall Back

Export shipments have fallen off materially since the embargo went into effect, and the authorities are much behind in issuing licenses. Anyone who undertakes to export steel or iron products must know where he is going to get them and must make sure where the tonnage is coming from for his accommodation. Ship space is very scarce. Prices have gone up from $20 to $25 a ton during the past month and space is hard to get. This situation is due to clear considerably under the agreement between the United States and Japan whereby the latter turns over 150,000 tons of carriers and receives in return 300,000 tons of shipbuilding materials, including steel plates and pig iron, 40,000 tons of which already are at the port of Seattle awaiting shipment. The steel plates and pig iron have been accumulating in Seattle since last fall when the ban went on exports of shipbuilding materials. The idea prevails that the government will not give Japan any new business through the mills, but will release the tonnage under contract in the east that now is lying in port. Japan is expected to present an increased demand for other materials going into ships such as steel bars and space will be scarce because of the vessels withdrawn. In the consignments at Seattle for shipment are 227 cars of pig iron and 410 cars of steel plates, aside from some pig iron, steel plates and other shipbuilding materials contained in 253,000 tons of Oriental freight.

The price of steel scrap is showing a tendency to rise above the $25 mark at which it has been selling for some time. Sales are being recorded at $27.50 for good grades, and some dealers are quoting $30.

The inclination of Seattle foundrymen is not to raise the prices of steel castings which have been running from 10 to 45 cents depending on the nature of the casting, although labor and transportation have both increased. All the foundries, both steel and iron, complain of a shortage of molders. The market price of gray iron machinery castings remains about the same as for the past four months, or from 7 to 8 cents a pound, and into higher figures, depending on the nature of the work. The iron scrap market in the Puget Sound section, particularly at Seattle, is showing a decidedly uncertain trend, the government price of $34 being overtopped by the demands of the junk dealers. They are asking as high as $42.50 for No. 1 foundry scrap and as high as $38 was recently paid. The dealers have been talking of sending their scrap to San Francisco, claiming an offer of $38 from that point.

The full effect of the 8-hour day upon the logging camps and lumber mills of Washington and Oregon, which went into effect March 1, has not yet been ascertained. The big question before the industry at the present time is to overcome the car shortage, which is very acute both as to government and commercial delivery. Concentration is being made upon this point with the hope of a solution in the near future. Many obstacles have been overcome, however, and the car shortage question is one that is being handled with intelligence. Strikes apparently are a thing of the past and the I. W. W. organization is not nearly so dangerous as it would have the world believe. Any trouble from that source will be promptly nipped in the bud by determined officials. As indicative of the awakened interest in the industry, one Seattle firm alone reports the sale of 16 locomotives of from 42 to 80 tons weight for delivery in the northwest, most of the sales being to logging railroads. The demand of the government and the fact that all possible effort is being made to utilize these vast resources of timber for both war and commercial purposes are other phases that undoubtedly mean a prolonged period of activity.

The greatest concentration of shipyard workers in the northwest is at Seattle, where approximately 25,000 are now employed. The question of transportation to and from their employment has been a serious one for some time and now seems on the point of solution. Those having the problem in charge have reached the conclusion that the use of steam trains offers a practical way out of the difficulty. The mayor has telegraphed Director General McAdoo for authority to use steam trains. In the meantime the city is to hasten the construction of an overhead electric line into the heart of the industrial district, and the local traction company is improving its transportation facilities.

As soon as these industrial workers began to arrive in considerable numbers, the housing question presented itself in a forcible manner. This is being largely met by citizens who have since the first of the year taken out permits for the erection of 769 homes at a cost of $1,155,795. Much remodeling and enlarging have been done and it is estimated that no further pressure of unsupplied demands will be felt until October. According to the number and value of building permits issued to date the balance of the year will be unprecedented in the matter of home building and the issue will be met for the workers yet to arrive. Other cities of the northwest are solving similar problems, but on a smaller scale.

Active preparations are being made for starting construction work on the extensive steel plant that is to be erected on Puget sound by B. L. Thane, manager of the Alaska-Gastineau mine, and others. Smaller plants are springing up, including a plant for smelting manganese ore, another for making high grade tool steel at Seattle and similar industries at the chief centers throughout the northwest.

Takes No New Charter

The Union Drawn Steel Co., Beaver Falls, Pa., recently received from the state department of New Jersey a certificate of authority to transact business in this state and precedent to this action, filed on March 4, 1918, with the secretary of state of New Jersey, a statement and designation, together with a copy of its Pennsylvania certificate of incorporation. This is a procedure required of foreign corporations under the laws of New Jersey. This matter represents a legal detail and not an incorporation or reincorporation of the company in New Jersey, as recently published.

Has No Building Plans

McKeesport Tin Plate Co. advises that it has purchased about 7½ acres of ground adjoining its present property, but up to this time have made no definite plans for making use of this land. The purchase represents a protection for the future and does not signify any early construction.

Confer on Canadian Merger

Representatives of Dominion Steel Corp. and Nova Scotia Iron & Steel Co. Consider Plan—Locate Nickel Plant

TORONTO, April 11.—Negotiations in connection with the proposed merger of the Dominion Steel Corp. and the Nova Scotia Steel & Coal Co. resulted in a formal conference between representatives of the two companies at Montreal, April 8. The Dominion Steel Corp. was represented by Mark Workman, president; William McMaster, vice president; Hector McInnes and George Caverhill, and the Nova Scotia company by Colonel Cantley, chairman of the board of directors; W. D. Ross, vice president, and N. B. McKelvie. The result of the conference is not known, but the general impression in commercial circles is that no material advance toward the realization of the project has been made.

The output of the Nova Scotia Steel & Coal Co. for the first quarter of the present year was as follows in tons: Coal, 133,466; iron ore, 59,150; limestone, 22,500; coke, 27,744; pig iron, 18,724; steel ingots, 26,555; finished steel and forgings, 19,859.

The British America Nickel Corp., which abandoned its former plan of erecting a refinery near its mines in the Sudbury district on account of the heavy cost involved in obtaining a supply of power, and has since been looking for a site, has decided to locate near Hull, Que. A site has been purchased at Deschanes upon which a refining plant will be erected at a cost of approximately $1,000,000. Construction will be started as soon as the frost is out of the ground.

The Canadian government has taken an option on six large ocean-going vessels, three of which are now under construction and the others shortly to be built at the plant of the Dominion Shipbuilding Co., Toronto. The ships now being built are of the improved Cunard type of 3550 tons each, and the others of the Friederichstadt type of 4300 tons each.

The boilermakers and iron shipbuilders employed by the Collingwood Shipbuilding Co., of Collingwood, Ont., have effected an agreement with the company giving them an increase in wages averaging from 25 to 30 per cent, a 9-hour in place of a 10-hour day, and recognition of a grievance committee of the men. The agreement is for one year from April 9.

The Canadian government has appropriated $50,000,000 for the purchase of railway rolling stock equipment and materials during the present year. Hon. Dr. Reid, minister of railways, stated that the total cost of the equipment so far ordered amounted to $32,966,515, not including the price to be paid for 100,000 tons of rails ordered from the Dominion Steel Co. for track renewals. With the additional amounts voted for loans to railway companies and for the purchase of Canadian Northern railway stock, the total expenditure this year on the railway transportation system will exceed $80,000,000.

Obituaries

RUFUS F. EMERY, aged 48, secretary and treasurer of the Westinghouse Airbrake Co., Wilmerding, Pa., and an officer and director of several other important corporations, died suddenly, April 11, when he was stricken with heart failure while seated at a desk in his office at the plant. Mr. Emery was assistant secretary of the American Brake Co., assistant secretary and a director of the National Brake & Electric Co., a director of the Vulcan Crucible Steel Co., secretary and treasurer and a director of the Westinghouse Friction Draft Gear Co., and a director of the Westinghouse Traction Brake Co. He was born near Boston and came to the Pittsburgh district in 1891, later became affiliated with the Westinghouse interests and played a prominent part in their upbuilding.

RUFUS FRANKLIN EMERY

Otto Moor, who was works manager of the Wood Newspaper Machinery Co., Plainfield, N. J., died recently at the age of 47.

Frederick Emmerich, president of the Emmerich Machine Mfg. Co., Brooklyn, died in New York on Wednesday, April 10, aged 71.

William A. Ridge, superintendent of the Gem Mfg. Co., Pittsburgh, died at his home in that city, April 7. He was 44 years of age.

J. Taylor Boyd, who for a period in excess of 50 years, has been superintendent and treasurer of the Cornwall Iron Co., Lebanon, Pa., died in that city recently aged 90.

George F. Riemann, senior member of the hardware manufacturing firm of Riemann & Seabury, died April 13, at his home in Brooklyn, aged 53 years.

Thomas Walker, aged 73, treasurer and director of the Columbia Steel & Shafting Co., Pittsburgh, died April 9 at his home in that city. In 1862 he formed a partnership with Thomas McVay under the name of McVay & Walker and operated a foundry in Braddock, Pa. Subsequently, Mr. Walker bought the interest of Mr. McVay and became the sole owner of the foundry and it was operated until one year ago. He became associated with the Columbia Steel & Shafting Co. in 1900. Mr. Walker had been connected with the Pittsburgh Wire Co., which operated a mill in Braddock until it was sold to the American Steel & Wire Co., in 1898. He then became president and treasurer of the Griswold Wire Co., which also was sold to the American Steel & Wire Co. In January, 1905, Mr. Walker was elected president of the Merchants Savings & Trust Co., Pittsburgh, a position he held up until his death. Besides his widow, Mr. Walker is survived by his brothers, Thomas A. Walker, secretary and director of the Columbia Steel & Shafting Co., and Alexander C. Walker.

Draw Line On Essential Industries

Preferred List of Those Branches of Manufacture Which Shall Receive Coal, Coke and Raw Materials Announced by War Industries Board—Iron and Steel Plants Receive High Rating

WASHINGTON, April 16—The first clear cut line of definite policy in distinguishing essential from nonessential industries of the United States was drawn by the war industries board's priorities committee last week and formally accepted by the fuel administration. The list shows which industries shall receive coal, coke and raw materials in preference to others and, despite the government's disavowal of any distinction between the two classes, is taken to indicate the most comprehensive compilation of preferred consumers.

List Iron and Steel Plants

All steel mills, blast furnaces and foundries engaged in war work, whose war production represents a substantial percentage of the entire output, are in the preferred class, along with many allied and related plants. The committee declared no distinction is made between any industries represented in the list which includes steel plants and rolling mills, manufacturers of wire rope, tin plate, machine tools, rails, locomotives, cars, railway supplies, aircraft, their parts and supplies, all kinds of coke ferroalloys, guns, explosives, small arms, chemicals, mining tools and machinery, and fire brick and plants producing electrical equipment, ships and ship material and equipment, electrodes, oil well equipment, gas and gas producing machinery.

Then the list takes in the army and navy camps and cantonments, domestic consumers of coal and coke, plants producing feed, those manufacturing fertilizers, plants engaged in preparing food for human consumption, manufacturers of food containers, laundries, mines, newspapers and periodicals, oil refineries, public institutions and buildings, public utilities, railroads, ships, soap manufacturers, tanning plants, manufacturers of tanning extracts, manufacturers of twine and rope, plants manufacturing hemp, jute and cotton bags and those engaged in the production of insecticides and fungicides.

The priority to be given fuel and raw materials for these consumers is not only to be followed by the agencies supplying and distributing them, but by the rail and water transportation systems carrying them, the war board's committee has ruled. Additional classes of industries and special individual plants may be added to the preferential list. The committee will issue certificates to plants on the list in order that proof of their war importance may be given without delay.

The action of the committee, which was formally announced by Judge E. B. Parker, chairman, is indicative of the general impression prevailing here that there is to be a very serious coal shortage next winter, possibly a recurrence of that of last, unless there is a marked increase in production and conservation. A meeting of state administrators here last week emphasized that point clearly. It is reported that many mines have been closed because of a car shortage and that even now there is danger of the demand getting ahead of the supply.

Voluntary Reduction Expected

Further emphasizing the government's intention to curtail nonessential industries and nonessential production in industries, the fuel administration has announced that representatives of the Automatic Machine Bottle Manufacturers' association have agreed to curtail production 15 per cent where the output is not entirely of food or medicine containers. In view of the arrangements the week before for a big reduction in the manufacture of musical instruments and the pressure being brought to bear by both the fuel and war industries boards, it is regarded here that attempts to deny distinctions are being made between industries are absurd. Other industries have agreed to reduce production in order to release fuel, materials and men.

Shaping Distribution of Coke by Zones

WASHINGTON, April 16.—The zone plan for distributing coke with a view to minimizing crosshauling by the railroads is gradually being whipped into shape by the coke division of the fuel administration and likely will be in full operation by July 1 when many of the present contracts expire. This was learned here last week following a conference of coke division officials and representatives of coke producers who took up the question of eliminating part of the crosshauling between Cleveland and Connellsville producers and consumers. The coke division expects to fully establish the zoning system through consideration of individual cases and is not devising a general blanket plan like the one made effective April 1 by the coal division of the fuel administration. Eventually the coke plan will become general and many thousands of miles of unnecessary hauling will be eliminated. Already several individual arrangements have been made and others are under consideration.

Switch McKinney Output

The latest readjustment contemplates the going into operation of the American Steel & Wire Co.'s new by-product ovens of Cleveland. It involves the McKinney Steel Co. and the Upson Nut Co., both of Cleveland, and the Taylor Coal & Coke Co.'s ovens in the Connellsville region. The transaction has not been completed but is expected to be shortly. Some time ago the coke division arranged that the by-product coke surplus of the McKinney plant be sold the American Steel & Wire Co., and the coke furnished the steel and wire company by the H. C. Frick Coke Co. should be sold to the McKinney furnaces at Scottdale and Josephine, Pa. Under the new plan, the McKinney plant, which is preparing to make foundry coke, will sell to the Upson Nut Co. and the Upson supply, now furnished from the Taylor ovens will be delivered to the two McKinney furnaces. It is said the plan involves the consumption of more than 10,000 tons of coke monthly.

Attending the conference last week were Price McKinney, president of the McKinney Steel Co.; R. F. Hall,

the Upson Nut Co.; H. Wilson, Rogers, Brown & Co.; L. E. Walters, the Clare Coke Co.; O. Mauser, the Stonega Coal & Coke Co.; C. E. Lenhart, district coke representative for the fuel administration, Connellsville regions; J. A. Galligan, district representative, Chicago; J. A. Ballard, district representative, Detroit; W. S. Blauvelt, coke director, and F. J. Herman, assistant to Director Blauvelt.

A few days before the conference the coke director, J. Leonard Replogle, director of steel supply, and Jay C. MacLauchlan, assistant to Replogle in charge of pig iron, met with railroad traffic men in the office of Carl R. Gray, director of transportation, under the railroad administration, and went over the coke and pig iron situation with the result that today it is reported that the movement of coke from ovens to eastern furnaces is much improved.

While this arrangement was being made, new coke prices were announced for certain districts in Alabama, West Virginia and Washington. These prices are:

Alabama: Black Creek, Brookwood and Blue Creek districts: coke made from coal mined in these regions, $8 for furnace and $8.75 for 72-hour selected foundry, except coke made from coal by the Empire Coal Co., at Empire, at $8.25.

West Virginia: Kanawha district, beehive ovens, Fayette county, $6.50 furnace and $7.50 for 72-hour selected foundry; Preston county, $6.75 and $7.75; and Nicholas county, all grades, $7.75.

Washington: Gas coke, $7.50; furnace, beehive or by-product, $10; and 72-hour selected foundry, beehive or by-product, $11.

Revised Conservation List on Exports Announced

Washington, April 16.—The war trade board has announced a revised export conservation list containing modifications and reclassifications of the one which was in existence prior to yesterday when the new list became effective. The new list contains few if any additional items affecting the iron and steel industry and such as they are have been announced from time to time since the first general conservation list was promulgated.

The most prominent change in the revision is the removal of the obligation requiring individual export licenses on the following, when consigned to Canada and Newfoundland: Aluminum and all articles containing aluminum; brass and articles containing brass except brass pipes, plates sheet and tubes; copper and articles containing copper except copper pipes, plates, sheets, tubes, sulphate and chemical compounds; nickel and articles containing nickel except chemical compounds and alloys; and manufactured rubber articles.

Contract Form is Ratified For War Buildings

Washington, April 16.—With the creation of the new construction division of the war department preparations were made to handle a building program aggregating $1,084,000,000. A board was appointed at once to examine the standard form of contract to make it "profiteer proof". This board which has just made its report consisted of A. N. Talbot, chairman, University of Illinois, president American Society of Civil Engineers; John Lawrence Mauran, St. Louis, president, American Institute of Architects; Charles L. Main, Boston, president, American Society of Mechanical Engineers; John R. Alpine, representing American Federation of Labor; R. Goodwyn Rhett, Charleston, S. C., president, Chamber of Commerce of the United States; E. W. Rich, Schenectady, N. Y., president, American Institute of Electrical Engineers; Frederick L. Cranford, Brooklyn, president, General Contractors Association of New York; Oscar Rheum, Chicago, representing the Building Construction Employers' association.

The contract form which was approved by this board is known as the cost plus sliding scale or fixed fee, in which fixed fees to the contractors range from 7 down to as low as 1¾ per cent on the largest sums. The fee according to this form is fixed when the contract is let and if the fixed cost exceeds the estimate, because of higher labor and material prices, the contractor receives no additional compensation. Labor and material prices will be subject to approval by the government.

Makes Freight Rulings on Billets and Iron Ore

Washington, April 16.—Class rates on billets, iron and steel articles taking billet rates, and iron and steel articles rated fourth, fifth and sixth class in official classification, in domestic shipments from Chicago, Cincinnati, Ashland, Ky., and Portsmouth and Ironton, O., to Boston, New York, Philadelphia and Baltimore, have been declared prejudicial in favor of Pittsburgh, Cleveland, the valleys and related points, by the interstate commerce commission. The complaint was filed by the Pollak Steel Co. Under the commission's ruling, the rate from Chicago, beginning July 1, must be no higher than 100/60ths, from Cincinnati 87/60ths and from Portsmouth, Ironton and Ashland 77/60ths of the rates contemporaneously maintained from Pittsburgh to seaboard.

In deciding the questions involved in an application filed by Joseph E. Thropp, owner and operator of two blast furnaces producing foundry pig iron, one at Saxton and the other at Earlston, Pa., the commission has ruled that carriers hauling iron ore from Conneaut Harbor, O., to these furnaces must not charge more than $1.37½ per gross ton beginning July. They will be allowed a 6 cents transfer charge if the haul is over other routes or from other lake points. The present combination rates run as high as $3.85. From Buffalo and Erie the rate is $1.54 plus the 6 cents transfer charge.

Capital Committee Passes on Many New Issues

Washington, April 16.—The capital issues committee of the federal reserve board has announced that in the future it will be guided as nearly as possible by the provisions of the war finance corporation bill so that the operations of the subsequent committee and the present committee will be as consistent as possible.

Last week the committee approved $33,023,000 in new issues, $25,000,000 of which was in a single issue of common stock. The aggregate compares with $18,894,000 in the same week a year ago. In addition to the new issues approved, sanction was also given for $864,000 for refunding purposes. Issues aggregating $21,049,000 were disapproved.

The present committee will continue until the one to be nominated by the President under the recent act has been confirmed by congress and formally organized. The President's action is expected momentarily.

Form Aircraft Companies

Four new companies were incorporated in the east during March for the manufacture of airplanes and accessories. These companies have a total capital stock of $6,250,000, and are as follows: The Columbia Aircraft Corp., Delaware, $150,000; the Liberty Aircraft Corp., New Jersey, $1,000,000; Murray-Willat Motor & Airplane Corp., Delaware, $5,000,000; the Williams Aircraft Corp., New York, $100,000. So far as can be learned, the formation of war companies was confined solely to those manufacturing aircraft.

Capital Odds and Ends

WASHINGTON, April 16.—President Wilson last week added four ocean transportation companies to the railroad systems now under control of Director General McAdoo. They are the Clyde, Mallory and Southern steamship companies and the Merchants & Miners Transportation Co. and the commandeering includes all of their property for the use of the government to the exclusion of any or all but war traffic. Director McAdoo is authorized to enter negotiations for the companies' just compensation.

* * *

Frederick J. Horne, vice president of the New York Trust Co., has been made director of the bureau of trusts in the office of Alien Property Custodian Palmer, succeeding Ralph Stone, president of the Detroit Trust Co., resigned.

* * *

Establishment of the following drayage charges at Coin, Iowa, are sought by the Chicago, Burlington & Quincy railroad: metal culverts weighing 20,000 pounds or less 11 cents per 100 pounds, over 20,000 pounds 10 cents per 100 pounds.

* * *

A special inspection division, with Charles M. Means, Pittsburgh, mining engineer, as chief, has been formed by the fuel administration. Mr. Means will have a large staff of assistants in the coal fields to check the output of the mines before it is shipped to consumers.

* * *

Establishment of a charge of $7.50 per hour for use of locomotive and switching crew in handling cars for loading iron ore from stock piles or shafts or otherwise serving iron mining companies, is sought by the Munsing, Marquette & Southern railroad.

* * *

The United States civil service commission has announced examinations for associate physicist and laboratory assistant; ship draftsman, architectural, mechanical, and structural draftsman; open to women who are subjects of countries allied with the United States in the war.

* * *

An increase of from $1.75 to $2.24 per gross ton in carload commodity rates on iron and steel scrap from Mondobi, Plebo, Spaum, Linderman, Requa, Price, and Osseo, Wis., to Chicago, Milwaukee, Racine, Wis., and related points is asked by the Chicago & Northwestern railroad.

* * *

Increase in rates on pig iron, cast iron pipe and other commodities between points in Indiana, and cancellation of rates from Louisville, Ky., to certain points in West Virginia and Kentucky is asked of the interstate commerce commission by several railroads.

* * *

Operators of wagon mines will not be permitted to add the cost of hauling to the government price, except for coal purchased by a railroad for its own use, because the demand for open top cars by mines that can load only into that type still exceeds the supply, the fuel administration has again ruled.

* * *

A fire protection section to co-operate with war manufacturers, and fire insurance officials in protecting war plants from fire and explosion dangers has been created by the war industries board. It's executive committee is headed by W. H. Merrill, Chicago, president of the Underwriters' Laboratories.

* * *

To prevent the removal of employes from their important duties, handicapping the railroad's part in war work, legal proceedings against the railroads while under federal control must be brought in the locality where cause of action arose or where the plaintiff resides, according to a ruling announced by Director General McAdoo.

* * *

The interstate commerce commission has found unjustified the Baltimore & Ohio railroad's proposed cancellation of arrangements for fabrication in transit of iron and steel articles at Baltimore and Washington, which would have resulted in increased rates on structural iron and steel from points in Pennsylvania, Ohio and West Virginia to points served by the Southern railway.

* * *

Director General McAdoo has notified railroads not to negotiate contracts of fire insurance covering a longer period than customary, or at most not longer than one year, without special authority from the railroad administration. This order was issued pending a decision on the question of insurance against loss or damage by fire to railroad property or property in the custody of railroads.

* * *

Senator Lewis of Illinois, often regarded as one of the President's mouthpieces in congress, last week in debate on the Overman bill declared the consolidation of the interstate commerce and federal trade commissions and the federal reserve board probably would be effected by the President if the bill becomes law. Opponents of the measure have declared such mergers entirely too radical.

* * *

An increase from 9 cents to 11 cents per 100 pounds in the carload rate on scrap iron and steel is sought by the Chicago, Milwaukee & St. Paul railroad between Chicago and stations taking the same rates, and Easton, Delavan and Winnebago City, Minn. An increase of from 15.2 cents to 15.8 cents per 100 pounds in the carload rates on stoves, ranges and heating apparatus between Chicago, points taking the same rates and Galesburg, Ill., is also sought.

* * *

Carriers seek establishment of the carload rate of 35 cents per 100 pounds on scrap iron from Kingman, Tapock, and Seligman, Ariz., to Pueblo, Colo., by way of the Atchinson, Topeka & Santa Fe, and Minnequa, Colo., by way of Pueblo and the Colorado & Western railroad. An increase of from 30 to 40 cents per 100 pounds from Pacific coast terminals to points in Colorado, New Mexico, Texas and Wyoming, is also asked on scrap iron carload rates.

* * *

The Pennsylvania railroad asks of the interstate commerce commission an increase of approximately 90 per cent of the current fifth class rates, and cancellation of carload rates from points on its line and the Pittsburgh & Lake Erie railroad to short haul points west of Pittsburgh, on acids except muriatic, sulphuric, and sulphuric and nitric acids, mixed. They also ask cancellation of carload rates on acids with the same exceptions, from points on their lines to certain points on the Baltimore & Ohio and the Pittsburgh & Lake Erie railroad.

Prepare Texas Stack For Early Operations

Rusk, Tex., April 18.—The 100-ton blast furnace here, recently purchased from the state of Texas by the Texas Steel Co., of Beaumont, is being overhauled preparatory to being placed in operation. The ore supply for the furnace will be obtained from the state-owned beds, situated adjacent to Rusk, for which the Texas Steel Co. is to pay a royalty of 50 cents per ton. The pipe-making plant here which the company has also purchased will be placed in operation soon. C. T. Heisig, of Beaumont, vice president of the Texas Steel Co., said that the construction of a large iron and steel plant at Beaumont will be started soon after the furnace here is put in running order.

"It is to be distinctly understood," said Mr. Heisig, "that we intend to built a plant in Beaumont. We are simply going into the Rusk proposition as the most available means of assuring the larger plant there. We want to get on a producing basis as quickly as possible, and once we do that, we shall have no trouble in securing the co-operation of the United States Emergency Fleet corporation in the matter of producing ship steel. We are not touching our main ore supply for use at Rusk. We have at Rusk in the state-owned ore beds enough good ore to last that plant for 40 or 50 years. We have in addition 16,000,000 tons of higher grade ore for use in the larger furnace to be built at Beaumont."

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

COL. RAYNAL C. BOLLING, of New York City, general solicitor and assistant general counsel of the United States Steel Corp., who has been in France for the past year as representative of the aircraft production board and recently was assigned other duties by General Pershing, which took him to the front, is reported captured or missing in official advices from the war department. Several years ago, Col. Bolling became interested in aviation and long before the United States entered the war, he offered his services in that branch of the army. He was granted a major's commission in the reserve corps in charge of organizing an air squadron from New York. When the government experienced difficulty in securing adequate training field space, Major Bolling paid out a substantial sum and leased one in his own name, where he remained until ordered to France about a year ago. At the war department, it was thought most probable that Col. Bolling was either shot down or forced to descend in enemy territory while engaged in a flight. He was born in Hot Springs, Ark., and is 41 years old. He is a Harvard man.

Eugene V. E. Thayer, president of the Chase National bank, and Thomas L. Chadbourne were recently elected directors of the Otis Elevator Co.

John W. Golden has severed his connection with the Keith Car & Mfg. Co., Sagamore, Mass., to accept a war position in Washington.

Joseph Risney, formerly superintendent of the foundry operated by the Iowa Valve Co., Oskaloosa, Iowa, has been appointed foundry superintendent of the new plant operated by the Davis Mfg. Co., Milwaukee, builder of tractor engines. F. N. Davis is president of this company and W. I. Denny, purchasing agent.

J. S. Gillespie has been made president of the American Hollow Boring Co., Erie, Pa. He formerly was shop superintendent of the National Forge & Tool Co. there.

R. E. Blazo is now affiliated with Reed, Fears & Miller, Inc., Boston, pig iron, having recently resigned his connection with the Philadelphia office of Rogers, Brown & Co., where he has been for the past year. Prior to locating in Philadelphia, Mr. Blazo was attached to Rogers, Brown & Co.'s Boston office.

A. W. Henn, formerly secretary and treasurer of the National Acme Co., Cleveland, was recently elected president to succeed W. D. B. Alexander,

RAYNAL CAWTHORNE BOLLING

who was made chairman of the board. Mr Henn will continue to discharge the duties of treasurer and as secretary he has been succeeded by N. S. Rathburn.

Robert J. Carroll has been elected president and treasurer of the Carroll Foundry & Machine Co., Bucyrus, O. He is a son of the late P. J. Carroll, who owned the Carroll company.

Sidney Diamant, 60 West 129th street, New York, has withdrawn his financial and other interests from the DeMant Tool & Machine Co., 79 East 130th street, that city.

H. M. Jerome became chief engineer of the Chalkis Mfg. Co., recently, upon his resignation as assistant chief engineer of the Chalmers Motor Co., Detroit.

W. E. Perrine, formerly director of production for the Standard Parts Co., Cleveland, has been promoted to the position of assistant general manager.

R. H. Shaw, formerly connected with the West Michigan Steel Foundry Co., Muskegon, Mich., has been appointed foundry foreman of the Acme Steel Co., Akron, O.

Dr. Ira N. Hollis, president of the Worcester Polytechnic institute, Worcester, Mass., and former president of the American Society of Mechanical Engineers, has been nominated as a candidate for overseer of Harvard college. He was a professor at the college before going to Worcester and an honorary member of the class of 1875.

A. E. Ward has been appointed sales manager of the International Oxygen Co., 115 Broadway, New York. Mr. Ward formerly was affiliated with the Prest-O-Lite Co., Indianapolis.

J. O. Osgood, vice president in charge of sales of the Chicago Pneumatic Tool Co., Chicago, will act as president until a successor is appointed to W. O. Duntley, who resigned recently from that position.

W. L. Byers and Julian B. Huff have been appointed district representatives of the fuel administration by Fuel Administrator Garfield, with headquarters at Uniontown and at Greensburg, Pa., respectively.

E. C. Angell, vice president of the William F. Davis Machine Tool Co., 149 Broadway, New York, is in charge of the recently established branch office at 945 Pennsylvania avenue, Washington.

Fred M. Shaw has been elected president of the Alfred L. Brown associates, Worcester, Mass., 17 Federal street, electric motors, of which Alfred L. Brown is treasurer and manager.

Donald W. Douglas has assumed the duties of chief engineer of the Glen L. Martin Co., Cleveland. He was formerly aeronautical engineer in the aviation section of the United States army signal corps.

C. M. Robertson is now affiliated with the Dale-Brewster Machinery Co., Chicago, as manager of the ma-

chinery sales department. He formerly was employed by the E. L. Essley Machinery Co., of that city.

F. R. Gilpatric has been promoted from having charge of the box-strapping department at the Stanley Works, New Britain, Conn., which he has occupied for some time, to the position of office manager.

Lieut. A. F. Winslow, son of W. H. Winslow, president of Winslow Bros., Chicago, architectural iron manufacturers, who are now at work upon a large government contract, shot down a German airplane inside the American lines recently and was awarded the war cross. He is 21 years old and enlisted with the Lafaytte escradrille last June but was later transferred to the American forces. He has been in six air battles.

J. W. Leers was recently appointed eastern manager for the Peerless Machine Co., Racine, Wis., manufacturer of hacksaws. His headquarters will be at 50 Church street where a stock of hacksaws will be maintained.

W. J. Gilmore, formerly foundry superintendent of the plant of the American Steel Foundries, Indiana Harbor, Ind., has been appointed works manager of the Hubbard Steel Foundry Co., East Chicago, Ind.

C. Smith, formerly production clerk of the foundry operated by the J. I. Case Threshing Machine Co., Racine, Wis., has been appointed foundry superintendent to succeed R. LaPoint who resigned recently.

Paul M. King upon his resignation from the Philadelphia district sales office of the Midvale Steel & Ordnance Co., became associated with the sales department of the Worth Steel Co., at Claymont, Del.

George J. Thust, general superintendent of the Globe Seamless Steel Tubes Co., Milwaukee, has with his son, Ray J. Thust, organized the Tire Recruiting Machine Co., Milwaukee.

E. J. Morrow has resigned as superintendent of the foundry operated by the Metals Production Equipment Co., Springfield, Mass., and has accepted a position as manager of the Mansfield Foundry Co., Mansfield, Mass.

Edward Mauer has been made superintendent of Detroit shops for the Solvay Process Co., having recently severed his connection as chief engineer with the Monroe Motor Co., Pontiac, Mich.

Walter J. Mahoney, labor statistician for the Reed-Prentice Co., Worcester, Mass., has been appointed a statistician in the ordnance division of the war department of the United States army and has reported to Washington for duty.

Louis N. Moore resigned recently as assistant to O. D. McClure, general master mechanic for the Cleveland-Cliffs Iron Co., at Marquette, Mich., and now has charge as master mechanic of an extensive mining group on the Gogebic range.

J. G. Shaw, formerly affiliated with the Milwaukee Steel Foundry Co., Milwaukee, is president of the recently organized Shaw Foundry Co. of that city. The plant produces gray iron castings. Mr. Shaw also is president of the Acme Steel Co., Akron, O.

F. J. Herman has severed his connection with the estate of W. J. Rainey in order to devote his full attention to his duties as chief assistant to W. S. Blauvelt, director of the coke division of the fuel administration.

A. H. Willey is now affiliated with the sales force of the Reliance Steel & Tool Co., New York City, with headquarters in Philadelphia, and will cover the Pennsylvania territory. He formerly was connected with Boker & Co., Inc., New York.

D. B. Clark, formerly shell department superintendent of the American Brake Shoe & Foundry Co., Erie, Pa., has been appointed general superintendent of the Watervliet arsenal, Watervliet, N. Y., in charge of the plant's entire production.

Frank Haber has been elected a director of the Central Foundry Co. to fill the vacancy caused by the retirement of Waddill Catchings from the board. DeCourcey Cleveland and S. J. Leonard have been elected directors for the three-year term.

E. M. Kilby, vice president of the Kilby Frog & Switch Co., Birmingham, Ala., was recently elected to the office of president of the National Steel Products Co., which plans the establishment of a plant at Birmingham.

Maj. Edgar Allen Custer addressed the Pittsburgh Foundrymen's association, April 15, on "The Manufacture of Semisteel Projectiles". He is chief in charge of inspection of all ordnance material produced in the Pittsburgh district.

L. C. Wilson has been appointed assistant to President Frey, of the Chain Belt Co., Milwaukee, and W. T. Hersher, for many years assistant superintendent of the Bridgeport Malleable Iron Works, Bridgeport, Conn., has been named superintendent of the malleable plant. Clifford Merwin of Holyoke, Mass., is in charge of factory production, and E. C. Wilson, formerly with the Foos Gas Engine Co., Springfield, O., has been appointed purchasing agent.

Frank F. Rowell resigned recently as secretary and sales manager of the I. B. Rowell Co., Waukesha, Wis., manufacturer of farm implements and machinery. He will assume the managership of the Independent Silo Co., St. Paul, Minn., immediately.

Robert C. Moeller, for 18 years connected with the American Steel & Wire Co., the last five of which as sales agent for the Worcester, Mass., district, has resigned to accept the position of general manager of the Collyer Insulated Wire Co., Pawtucket, R. I.

Francis E. Norris resigned recently as superintendent of the Sharon and Farrell, Pa., plants of the Carnegie Steel Co. He has taken a three-year contract with Berliet, an automobile manufacturer of France, for whom he will erect a steel plant at Lyons, France.

F. T. Whitcomb, who resigned recently as signal engineer of the Boston & Albany railroad, Boston, is now affiliated with the Federal Signal Co., in an important capacity. His former assistant, George A. Kirley, succeeds him and E. I. Gardiner becomes assistant engineer.

F. G. Peterson has been appointed foundry foreman of the casting plant operated by the Bucyrus Co., South Milwaukee, Wis. For many years he was connected with the Pratt & Letchworth Co., Buffalo, and subsequently he was with the Stock Steel Process Co., Detroit.

P. W. Dillon, who for seven years has been secretary and general sales agent for the Northwestern Barb Wire Co., Sterling, Ill., recently volunteered his services to the government and has received a captain's commission in the quartermaster's department, Washington, D. C.

Henry Brewer, Beloit, Wis., recently resigned as assistant chief engineer of the oil engine development department of the Beloit works, Fairbanks, Morse & Co., to accept a position as chief engineer of the combustion engine department of the Worthington Pump & Machinery Corp., at Cudahy, Wis.

Henry Bruere, vice president, and J. B. Beaty, treasurer of the American Metal Co., New York, have sailed for Switzerland, with the sanction of Washington authorities, to negotiate with German capitalists for the elimination of German ownership of mining interests in Mexico allied with the American Metal Co.

Iron and Steel Men in War Machine

Wallace D. Simmons, Member of Excess Profits Tax Advisory Board

WALLACE DELEFIELD SIMMONS in November, 1917, by appointment of Secretary of Treasury McAdoo, became a member of the President's "dollar-a-year" business battalion. He with eight others, comprise what is now known as the excess profits advisory board. This committee of nine was named to assist Commissioner of Internal Revenue Roper in the administration of the excess profits tax law. Meetings have been held continuously and the thousand and one questions which have arisen have been amicably adjusted. The board's rulings and interpretations have been accepted by Secretary McAdoo and published as practically the law. Original estimates of total returns from this one tax were placed at $1,226,000,000 but calculations made recently in Washington double that figure and it is stated that 6,000,000 returns will be made by June 1. This suggests something of the problems which the advisory board faced especially in view of the uncertain language of the tax law.

Since 1896 Mr. Simmons has been president of the Simmons Hardware Co., St. Louis, founded by his father, E. C. Simmons. This business now has a total capitalization of $4,500,000. The son entered the business as a clerk shortly after being graduated from college in 1890. He was made a member of the board of directors two years later and his rise to the presidency through successive promotions in various departments brought him in contact with hard work and gave him a wide grasp of broad commercial questions which has made him a national figure in the world of business. His broad experience has enabled him with others, to handle from a business man's view point the many perplexing matters presented to the advisory board. This perhaps is the secret of the general satisfaction with which the findings of the board have been received.

Immediately upon President Wilson's declaration of war against Germany. Mr. Simmons volunteered for service under the government, believing that in a business way, his aid best could be given the nation. He has been a valuable aid to both Secretary of War Baker and to Secretary McAdoo. In addition to his duties on the excess profits advisory board, he is a member of the commercial economy board of the council of national defense. In this capacity he has helped to effect extensive economies in the conduct of the nation's affairs.

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WALLACE D. SIMMONS

In speaking of the effort of the advisory board in connection with the excess profits tax, he said: "As originally interpreted, the law would have forced many concerns out of business. Since the government has no desire to injure any business, the advisory board's interpretation was accepted and now American industry is able to live up to the law's regulations and continue to transact business."

Mr. Simmons was born in St. Louis 51 years ago and was educated at Smith academy in that city and at Yale university, from which he graduated to enter his father's employ.

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Battle Interrupts After-War Trade Talk

FROM a commercial standpoint, the signing by President Wilson of the Webb Pomerene bill permitting combinations for export trade, is the most important of recent developments. After the war, American manufacturers will have to face the unified tactics of European buying in their most acute form. Unquestionably, while the Webb-Pomerene law properly safeguards against abuse, it permits a freedom of action in the foreign markets to which the American export trade heretofore has been a stranger.

However, with the German hordes battering against the allied wall in France, the significance of this enactment is diminished for the time. As a London contemporary says, "it is the common remark here today that even such questions as economic conditions and financial supremacy after the war, about which the business instinct both of England and America has prompted constant consideration, are out of touch with the spirit of the moment; all such matters may, in fact, be settled on the battlefield." He further suggests the German offensive may have been stimulated, in part, by a desire to achieve victory before too much American blood had been shed, with the inevitable consequences in future relations.

In this connection the threat of economic pressure to be applied to Germany after the war is being heard more frequently. The expedient has been proposed that if the German government does not agree to suspend hostilities within a fixed period, for every week that the war is prolonged, no German vessel shall enter or leave any American port, including the Panama canal, for one year.

The confused military situation has had a disquieting influence on the security market, yet the feeling thus far has not been one of serious apprehension. Shares of iron and steel producers declined fractionally last week. Shares of railroad equipment generally declined from two to three points, but these decreases were due to a specific cause. Equipment manufacturers have been in Washington discussing the situation with regard to distribution of contracts for cars. In their conference with the government, it is understood the manufacturers offered to take the business at a cost plus 10 per cent basis. On the other hand, some government authorities opposed this plan, holding that a percentage on the invested capital as a profit would be fairer. The manufacturers are emphatically against this plan and will oppose it to the last step.

Approve Frick's Purchase of Thompson Lands

The purchase of the J. V. Thompson coal lands by the H. C. Frick interests, involving $6,000,000 has been confirmed by J. G. Carroll, referee in bankruptcy of the Tompson estate. He dismissed all exceptions to the sale and directed that all mortgage creditors involved in the 12,000-acre deal be paid in full with interest. He directed that none of the costs should be borne by the mortgagees. Mr. Carroll directed that $3.200,000 of the purchase price should be paid to the Thompson estate. The decision willl be forwarded to the district court of western Pennsylvania for final confirmation.

Lackawanna Steel's First Quarter Encouraging

As the first of the leading steel companies to return a financial report covering its first quarter operations, the presentment of the Lackawanna Steel Co. for the three months ending March 31, 1918, is regarded as highly encouraging. In the face of the extraordinary traffic and weather conditions in January and February, which held back shipments, and the lower prices fixed by the government, the profit for the quarter was $2,996,747, or only $460,253 less than for the corresponding period in 1917. This is equivalent to 34.15 per cent earned on the outstanding common stock as against 39.40 per cent. The bonded obligations in 1917 and royalties for the first quarter were $96,501 less than for a similar period last year. Unfilled orders as on March 31 were 781,199 tons against 992,096 tons March 31, 1917.

The comparative income account in which the 1917 figures have been adjusted to include proper proportions of the provision for war excess profit tax is as follows:

	1918	1917
Total net earnings....	$3,759,987	$4,369,649
Lackaw. Steel bds. int.	233,156	311,293
Subsid. bond int.....	44,261	54,083
Rentals and royalties..	.....	8,542
	277,418	373,919
Balance	3,482,569	3,995,729
Extinguish. mines.....	87,904	101,685
Deprec., renewals.....	397,917	437,042
	485,821	538,728
Profit	2,996,747	3,457,000

Almost Doubles Gain

Gross income of the Central Foundry Co., New York City, for 1917, totaled $2,203,911, exceeding 1916 by $1,232,805. Federal war taxes absorbed $558,562 and the sinking fund and depreciation account was more than doubled, as compared with 1916, being $286,289 against $112,403. Net profits in 1917 were $1,228,441 as against $675,709 the previous year. "These excellent results," said President de Courcey Cleveland, "were largely brought about the demand for the output of the Central Iron & Coal Co., a subsidiary, and for special castings made by the steel plants. Assets as of Dec. 31 totaled $10,995,021 while in 1916 they stood at $11,094,855, investments in subsidiaries falling off from $1,441,575 to $1,296,025, and notes and accounts receivable being reduced to $561,465 from $609,654. Liberty bond holdings total $161,908.

Inventory Runs High

Net income of the Otis Elevator Co. during 1917 amounted to $799,263, an increase of $62,675 over 1916. After all charges and preferred dividends, the balance for the common stock was equal to $6.42 a share, compared with $5.44 in 1916. President W. B. Baldwin said in part:

"The volume of business for 1917

was the largest in the company's history as well as the most profitable. The proper execution of this work has necessitated the carrying of large inventories, abnormally so owing to the high prices of labor and material and the unusual difficulties in obtaining them when needed. These conditions are reflected in our bills payable account, the high point of which was reached in November last. Since that time there has been a steady and substantial reduction in this account, and this liquidation will continue during this year as contracts in hand are completed."

The comparative income account is as follows:

	1917	1916
Net earnings	$1,788,577	$1,036,588
Depreciation, res.	889,304	250,000
Pension fund	100,010	50,000
Net income	799,263	733,588
Preferred dividends	390,000	390,000
Common dividends	318,575	318,575
Balance	3,482,569	3,995,729

Almost Triples Profits

Net profits of the Haskell-Barker Co. in the fiscal year ending Jan. 31, 1918, were almost triple those of the preceding comparative period. The profits were equivalent to $9.27 a share on 220,000 shares of capital stock of no par value as compared with $3.15 in the preceding fiscal year. The comparative income account is as follows:

	1918	1917
Gross earnings	2,634,192	1,135,367
Repairs, renewals	293,333	305,749
Ext. renew.	300,000	135,000
Net profit	2,040,839	694,618
Dividends	660,000	165,000
Surplus	1,380,859	529,618

Coke Companies Merge

A charter for the merger of four coal and coke companies into the Hecla Coal & Coke Co. has been filed at Greensburg, Pa. The new organization is made up of the Hecla Coal & Coke Co., the United-Connellsville Coke Co., the Hillman-Neff Coke Co. and the Bessemer Coke Co. The new corporation is capitalized at $5,975,000. The stock is divided into 59,750 shares, of a par value of $100 each. The directors of the consolidated company are: John H. Hillman Jr., Ernest Hillman, Arthur B. Sheets, Thomas Watson and John C. Neff of Pittsburgh, James C. Choplin of Sewickley and George S. Harsh of Uniontown. J. H. Hillman is president, Mr. Sheets vice president, Thomas Watson secretary and Robert W. Flemiken of Pittsburgh, treasurer.

Had Satisfactory Year

The Barrett Co., New York, last year sold $34,297,371 worth of goods, an increase of $6,497,185 over 1916. Expenses absorbed $27,193,090, an increase of $7,160,988, including depreciation, and presumably, federal taxes. Net income before charges and dividends was $3,673,244, a decline of $1,492,042. The balance available for common stock was equal to $21 a share. President William H. Childs, in the annual report to stockholders, said that considering the high cost of labor and material, and the unusual outlay of earnings in taxes, the result of the year was considered satisfactory. The income account compares as follows:

	1917	1916
Net sales	$34,297,371	$27,800,186
Cost of goods	27,173,090	20,012,102
Gross profit	$7,124,281	$7,788,084
Other income	2,111,590	1,759,521
Total income	$9,235,871	$9,547,604
General expense	5,562,626	4,382,317
Net income	$3,673,244	$5,165,286
Interest	211,855	158,656
General res.*	.....	750,000
Adjust.	268,055	.....
Net profit	$3,729,444	$4,256,630
Other profit	1,142	8,771
Net profit	$3,728,302	$4,247,858
Preferred dividend	425,265	333,249
Common dividend	1,034,542	2,817,325
Surplus	$2,268,494	$1,097,283

*Represents depreciation treated this year as a manufacturing expense and included in "cost of goods sold."

Steel Holdings Grow

Common stock of the United States Steel Corp. was more widely distributed on March 1 than ever before. The total number of stockholders on that date was 61,044, giving each shareholder an average of slightly more than 83 shares. The previous high record was 56,825 shares on March 1, 1915. Holders of preferred stock numbered 80,863 on Feb. 1 last, an aggregate about 5600 smaller than on the same day in 1915. Foreign holdings of both preferred and common changed little in the quarter ending March 31; the common held abroad amounted to 485,706 shares, an increase of 1516 shares over Dec. 31.

Had Best Year

Another company to join those which enjoyed the best year in their respective histories in 1917 is the Sullivan Machinery Co., Chicago. Its net earnings for 1917 were $2,413,876 as against $1,313,906 the previous year. The company's authorized capital is $4,000,000, of which $3,846,800 is outstanding, and the net income, after reserving $800,000, or 20 per cent, for income and excess profits taxes with $242,794 deducted for depreciation, of $1,371,081 is equal to 35.6 per cent on the capital, as against 26.5 per cent in 1916. The 1917 surplus after all deductions of $986,401 compared with $403,558, brought the company's entire surplus up to $2,188,404.

Toluol Released

For Private Purposes by Government —Solvent Naphtha More Active

New York, April 13.—The government committee in charge of the distribution of toluol acted favorably this week upon numerous additional applications for the product for commercial use. So far, the toluol released has been for pharmaceutical and dyestuffs manufacture. The policy of the committee is to release toluol for necessary purposes but as sparingly as possible. Applications must be accompanied by full supporting data regarding the requirements and for what purpose the toluol is to be used. The toluol being released is going from $1.75 to $2 per gallon.

Although demand for benzol has not fallen off, production has increased until it is in excess of consumption and stocks again are accumulating. The market on pure benzol is at 30 to 35 cents per gallon. A bigger business was transacted in solvent naphtha. Numerous good-sized inquiries are pending. Demand has expanded to such an extent that stocks have shrunk materially. The market is strong at 18 to 22 cents per gallon. Large sales of crude naphtha were made at an average of about 15 cents per gallon.

Sales of phenol continue only for spot requirements, at 52 to 55 cents per pound. The output is sold up for some time and very little spot is available. Although inquiries for naphthalin are not especially active, unfilled requirements are exceedingly large. Naphthalin continues nominally at 10 to 12 cents per pound.

Sales of spot sulphate of ammonia were made this week on the basis of $5.55 to $5.60 per 100 pounds at tidewater, an advance of 10 to 15 cents.

Coke Oven By-Products

Spot	
Per Gallon at Producers Plant	
Pure benzol	$0.30 to .35
Toluol (on sales sanctioned by government)	1.75 to 2.00
Solvent naphtha	.18 to .22
Per Pound at Producers Plant	
Phenol	$0.52 to .55
Naphthalin (nominal)	.10 to .12
Per 100 Pounds at Seaboard	
Sulphate of ammonia	$5.55 to 5.60
Contract	
Pure benzol	$0.30 to .35
Pure benzol	.35 to .40
Toluol	nominal
Solvent naphtha	.18 to .22
Per Pound at Producers Plant	
Phenol nominal.	
Per 100 Pounds at Seaboard	
Sulphate of ammonia	nominal

Limited Lists Characterize Market

Small Demands for Machine Tools Continue to Furnish Main Volume of Business—New Shell Steel Placed is Expected to Require Quantity of New Machines—Crane Demand More Brisk

LIGHT inquiries from scattered sources characterize the eastern machine tool situation while western districts report a more active market similarly composed of small-lot demands. Shipbuilding and aircraft work have received an impetus in the east and the condition is reflected in increased tool requirements. The crane market in particular has felt the effect of the ship situation and a reviving tendency has been noted. The largest single order of the week was for 28 cranes placed with the McMyler Interstate Co., Cleveland, by the American International Shipbuilding Corp., Philadelphia. A number of important airplane motor contracts about to be consummated will furnish some tool demand in the central west, but as the contracts will be placed with companies already equipped to manufacture motors, the machines required will be principally those necessary to the highly accurate operations required by the rigid specifications. A large gun carriage order, said to have been placed with the Willys-Overland Co., Toledo, will require a number of planers and drilling machines. The huge tonnage of shell steel now being placed with the various mills will furnish a heavy demand for tools. Forging presses, it is understood, are already being sought in some districts in anticipation of this work. As this work is handled on through to the machine shops, added equipment will be required in large quantities. The normal inquiries from the railroads, usually experienced at this season, are lacking. Mechanical engineers for some roads report that new equipment is badly needed in their shops, but that deliveries are secured with difficulty on even the most needed tools, so that the futility of a large list is appreciated at this time. A growth is noted in the tractor business and some tool demand is coming from the navy department, bureau of supplies.

Diversified War Work Demands Added Tools

WHILE considerable delay apparently is being experienced by the government in getting its heavy ordnance program under way, it is believed now that this work will go forward shortly. Until something further develops, however, the present comparative lull in the eastern machine tool market may be expected to continue. At present, demand is made of small, scattered lots. The Plymouth Cordage Co., Plymouth, Mass., is buying some shellmaking equipment. Fred T. Ley & Co., New York, are in the market for several pipe machines for the plant of the Atlas Power Co. now under construction at Perrytown, Md. The Braden Copper Co., 165 Broadway, New York City, is inquiring for some casting machinery for shipment to South America. The British American Metal Co., New York, recently purchased the 10-acre plant of the Manganese Steel Safe Co., at Plainfield, N. J., for the manufacture of marine hardware and other specialties, and is buying some new equipment. The New York Shipbuilding Co., New York, is in the market for some plate and angle shop equipment.

Among recent buyers of punching and shearing machinery are the Hedden Iron & Construction Co., New York City, the Virginia Shipbuilding Co., Alexandria, Va., and Babcock & Wilcox, New York City. Considerable machinery is expected to be purchased soon by the Carolina Aircraft Co., which recently was organized at Raleigh, N. C., with $500,000 capital stock, to build a plant in that city. Harry N. Atwood, aeronautical engineer, is directing head of the company. Included in other prospective business is that of the Delaney Forge & Iron Co., Buffalo, which is soon to start on a new forge and machine shop. The Morgan Machine Co., Rochester, N. Y., is building a $25,000 addition to its machine shop. C. W. Clark, architect, Cortland, N. Y., is completing plans for a $20,000 machine shop, in that city, for a company whose name is to be announced later. Work on additions, costing about $60,000, will be started shortly by the Cattaragus Cutlery Co., Little Valley, N. Y. The Foster Machine Co. contemplates the erection of a new machine shop at Westfield, Mass.

Crane Inquiries Pick Up

Crane business shows a marked increase over the past weeks. A 10-ton electric crane, with 50-foot span, is being sought by the Bethlehem Steel Co. for its plant at South Bethlehem, Pa. The Gilbert & Barker Mfg. Co., Springfield, Mass., is inquiring for a 5-ton electric crane. An electric crane of similar capacity is soon to be purchased by the Lundin Steel Castings Co., Neponset, Mass. The British-American Metal Co., New York, will purchase two 3-ton electric cranes. The government is negotiating for a 5-ton and 30-ton electric crane for the naval base store in Brooklyn. Four 2-ton cranes will also be purchased for the Brooklyn navy yard. The Merrill-Stevens Shipbuilding Corp., Jacksonville, Fla., is asking bids on one 50-ton and two 25-ton cranes. The Cambria Steel Co. is inquiring for 22 hoists, of 1½ tons capacity each. The American International Shipbuilding Corp., Philadelphia, has ordered a large number of additional cranes for the plant at Hog Island. It is understood the McMyler Interstate Co., Bedford, O., has taken the major portion of this business, including twenty-four 10-ton and four 35-ton locomotive type gantries.

Market is Active on Small Lots

AN UNDER current of strong activity is apparent in the machine tool market throughout the Cleveland district. Contracts pending, in the process of being closed, and work recently allotted furnish a steady

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Chicago Office: 1370 People's Gas Bldg., 122 So. Michigan Blvd.
C. H. Beach, District Representative.

Philadelphia Office: 603 Widener Bldg.
Frank Wallace, District Sales Mgr.

Syracuse Office: 621 University Block
T. B. Davies, District Sales Mgr.

J. E. Dockendorff & Co., 20 Broad St., New York, General Export Agents.

demand. Small-lot buying, however, predominates as previously, and with one or two exceptions, large lists are not extant. The Willys-Overland Co., Toledo, have closed for a number of cutting-off machines for shell work, but are still in the market for turret lathes and other miscellaneous tools. It is said that an order for gun carriages has been placed with this company which will require added equipment for its completion. The placing of contracts for a quantity of highly specialized airplane motors is expected to create new business within the next few weeks. The character of the work on these motors will require special tools and gages. The Cleveland Frog & Crossing Co., Cleveland, is inquiring for a 48 x 48-inch by 12-foot planer. The E. F. Hauserman Co., Cleveland, is in the market for a 24 x 24-inch 8-foot planer and a 16-inch shaper. Ohio State university, Columbus, O., will purchase a turret lathe and a stationary head drill. The United States Metal Goods Co., Cleveland, has issued a list for miscellaneous tools. The Falls Rubber Co., Cuyahoga Falls, O., is inquiring for a 16-inch shaper. The Keystone Brass Co., Erie, Pa., will purchase a No. 2 universal milling machine. The Shuler Axle Mfg. Co., Detroit, is inquiring for a vertical miller and a cylindrical grinder. Construction has been started on a factory building for the Automobile Screw Products Co., Cleveland.

Forging Press Demand in Pittsburgh District

MAKERS and dealers in the Pittsburgh district report that the government is buying certain kinds of machinery and machine tools in greater quantities. Forging presses are in better demand and it is believed that the government is preparing to hurry the building up of capacity for the production of shells in connection with its numerous requirements for shell steel for last half delivery. The domestic market for machinery and machine tools is extremely dull, buyers withholding purchases on account of the high prices and long deliveries. Car supplies are much better and shipments on government work have improved considerably as a result.

Requirements Light in Chicago

WHILE the absence of large requirements from the Chicago market is still noticeable, there is some increased activity offering a possibility of larger business. The Chicago, Burlington & Quincy railroad is an exception to the rule in that industry of not buying now because of government control, and is inquiring for considerable equipment. The Standard Steel Car Co., a large buyer for its new munitions plant at Hammond, Ind., has been buying steadily and is still in the market for additional tools. Among the concerns buying to fill out requirements is the Inland Steel Co., which is completing the equipment of its new machine shop at Indiana Harbor, Mich. Buying by small shops to equip for subcontracts on war work continues to make up the bulk of business. Tractor manufacturers are active and are taking on much work which requires additional equipment. W. J. Dennis & Co., manufacturers of metal specialties, is building a plant in Chicago. The Liberty Car & Equipment Co. has bought a plant from the Central Locomotive & Car Works, involving 33 acres and buildings, in Chicago. The American Equipment Co., Bucyrus, O., manufacturer of brickmaking machinery, has bought a plant from the Illinois Brick Co., in the Calumet district, Chicago.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

AUGUSTA, ME.—The New England Violano Co. has been incorporated to manufacture musical instruments, with $170,000 capital by E. M. Leavitt and Ernest L. McLean.

BATH, ME.—The plant of the Watson-Frye Co., engaged in the manufacture of bronze castings for the Emergency Fleet corporation and machinery for paper and pulp mills, was damaged by fire Saturday, with a loss of $75,000. The fire, which is beliefed to have been due to spontaneous combustion, started in the foundry, which is of concrete construction, and spread rapidly to the rest of the structure, which is wooden.

BIDDEFORD, ME. — The Saco-Lowell Shops will build a brick, 1 and 2-story factory, from plans of Lockwood, Greene & Co., Boston, engineers.

EAST DEERING, ME.—The United States shipping board has selected the plant of the Portland Ship Ceiling Co. as the site for a government dry dock to cost between $400,000 and $500,000.

PORTLAND, ME.—The Chicago Coke & Chemical Co., the purpose of which is to acquire and operate patents, has been incorporated here with a capital of $100,000 by Clarence G. Trott, P. B. Drew, David F. Drew, Charles W. Hamilton, J. W. Cady, L. W. Merritt and James G. Doyle, all of this city.

PORTLAND, ME.—The Nassau Co., which proposes to do a general shipbuilding business has been incorporated here with a capital of $5000 by George T. Spear, South Portland and Elmer Perry and E. Sawyer, of Portland.

SPRINGFIELD, VT.—The Colonial Light & Power Co. will build a brick and concrete, 1 and 2-story, 100 x 75-foot sub-station on Clinton street.

SUNAPEE, N. H.—The Brampton Woolen Co. will equip the plant formerly owned by the U. S. Hame Co., which it is renovating, with entirely new machinery, to include 48 new looms.

BOSTON.—Fire in the 5-story building at Beverly and Causeway streets, occupied by Richards & Co., Inc., dealer in metals, the Eastern Metal & Refining Co., and the American Glue Co., caused $100,000 damage, April 1.

BOSTON.—Bids will be received soon by Engineer George P. Carver for the construction of a coal pocket, with 1200 tons capacity for the Mattatan Coal Co.

BOSTON.—The B. F. Sturtevant Co. will build a 1-story, 86 x 228-foot addition to its plant for the manufacture of airplanes. J. Nickelson & Sons have received the general contract.

CAMBRIDGE, MASS. — A foundry yard craneway will be erected by the Aberthaw Construction Co. for the Worthington Pump & Machinery Corp. on Fifth street near Bent street. It will be built of structural steel, 60 x 60 x 300 feet, and will cost $25,000. Plans are by the company's engineers.

CHERRY VALLEY, MASS. — The Olney Woolen Mills Co. has awarded the contract for the erection of an addition to its picker house.

FITCHSBURG, MASS.—Plans are being drawn by Architect John O. DeWolfe for a 3-story, 50 x 140-foot addition to the plant of the Simons Mfg. Co.

MAYNARD, MASS.—Construction work has begun on the addition to the Assabet Mills

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of the American Woolen Co., which are located here. The building is to be 510 x 80 feet and 5 stories high.

SOMMERVILLE, MASS.—George P. Carver, engineer, Boston, is drawing plans for an addition to the coal handing plant of the Shawmut Coal Co.

SPRINGFIELD, MASS.—A hearing was held at the city hall here recently by the legislative committee on cities on a bill to permit Springfield to develop power from its Little River system. There was no real opposition to the bill and most of those who attended the hearing spoke heartily in favor of it. It would give the city the right to develop a plant giving 4000 horsepower, which might be used for municipal lighting or be sold.

SPRINGFIELD, MASS.—The government has let the contract for a brick extension to the administration building at the United States arsenal, to cost $45,000.

SPRINGFIELD, MASS. — The Stone & Webster Corp., Boston, has been given the contract by the United Electric Light Co. for extensive improvements at its State street plant to cost $300,000. A 25,000-horsepower steam turbine and new switchboard equipment will be installed.

UXBRIDGE, MASS.—Samuel F. Scott has let the contract for a brick, mill construction, 2-story, 62 x 42-foot picker house at his Elmdale mill.

WORCESTER, MASS.—C. E. Sandberg, sheet metal manufacturer, has had plans made for a brick and reinforced concrete, fireproof, 4-story factory building to contain 13,000 square feet and to cost $50,000, at Thomas and Commercial streets.

WORCESTER, MASS.—Fire in the Day building annex, rear of 274 Main street, occupied by the New England Steel Roofing Co. and others, caused $150,000 damage, April 4.

WORCESTER, MASS. — The William H. Sawyer Lumber Co. has let the contract for two brick and wooden storage buildings to cost $21,000. Plans for a power house, office building and other buildings are being made.

WORCESTER, MASS.—The R. B. Phillips Mfg. Co. has let the contract for two 1-story, 40 x 30-foot and 40 x 42-foot storage buildings at its Grand street plant.

EAST GREENWICH, R. I.—The Greenwich Mill has let the contract for a brick, mill construction, 1-story, 94 x 50-foot addition to its mill on Division street.

NEWPORT, R. I.—The government will build a brick, reinforced concrete, and steel, fireproof, storehouse to cost $80,000 at the naval training station.

PAWTUCKET, R. I.—The plant of the Narragansett Machine Co., making steel lockers and gymnasium apparatus, was damaged $150,000 by fire April 4.

PAWTUCKET, R. I.—The Cruise & Smiley Construction Co. has been awarded the general contract for a $300,000, 2-story, 50 x 150-foot warehouse by J. & P. Coates, Inc.

PROVIDENCE, R. I.—The Jenkinson Machine & Tool Co. has been incorporated with $30,000 capital by Robert Jenkinson, Mansfield, Mass., Robert S. Ortoleva and Sebastian H. di Jester.

PROVIDENCE, R. I.—The Temple Mfg. Co. has been incorporated to make tools and machinery with $5000 capital by John M. Gibb, Carl A. Tingler and Joseph C. Condon.

BRISTOL, CONN.—The factory of the Munroe Muzzy Pen Co. in Edgewood was destroyed by fire April 1, with a loss of $30,000.

CHESHIRE, CONN. — The Connecticut Brass & Mfg. Co. has awarded a general contract to T. J. Pardy Construction Co., Bridgeport, Conn., for the construction of a plant addition. The new building will cost $15,000, and will be 1-story, 56 x 65 feet.

DERBY, CONN.—The Acme Tool & Machine Co. has been incorporated with $100,000 capital by Albert K. Kennedy, Harry G. Williams, Shelton, Conn., and Harold E. Drew, Ansonia, Conn.

HARTFORD, CONN.—The Arrow Electric Co., manufacturer of electrical specialties, will build a brick, mill construction, 3-story, 80 x 125-foot factory building and a reinforced concrete coal pocket on Hawthorne street.

MERIDEN, CONN.—The Malleable Iron Fittings Co. has let the contract for a concrete and stone, 2-story, 61 x 121-foot building and a 1-story, 40 x 50-foot building for the storage of patterns.

NEW BRITAIN, CONN. — The Skinner Chuck Co. will build a brick and reinforced concrete, 1-story, 28 x 51-foot addition to its plant on Church street, to be used as a hardening room.

NORTH GROSVENOR DALE, CONN.—The Grosvenor Dale Co. has let the contract for an addition to its hydro-electric plant, to cost $30,000. C. W. Praray, New Bedford, Mass., is the engineer.

SHELTON, CONN.—The D. N. Clark Co. has been incorporated to manufacture hardware, with $100,000 capital, by Daniel N. Clark, W. Kneen and Dudley W. Stratton.

SOUTHINGTON, CONN. — The Miller Metal Works Co., Jersey City, N. J., has purchased the plant of the Brass Fixtures Co., to which it will remove its business. Edmund L. Curtis, formerly of Southington, is treasurer of the company.

STAMFORD, CONN.—Baer Bros. are replacing their factory buildings which were recently destroyed by fire with three, 3-story, 75 x 300-foot buildings, standing parallel with each other.

Along the Middle Atlantic Seaboard

BROADALBIN, N. Y.—Architect H. S. Moul, Gloversville, N. Y., is drawing plans for a 3-story addition to the mill of the Broadalbin Knitting Co.

BROOKLYN, N. Y. — Westinghouse, Church, Kerr Co., 37 Wall street, New York city, has received the general contract for the construction of a power plant at the Brooklyn navy yard.

BROOKLYN, N. Y.—Plans for a $90,000 plant addition are being drawn by Architect W. B. Wills, 1181 Myrtle avenue. The name of the owner is being withheld.

BROOKLYN, N. Y.—Ira S. Bushey & Sons have purchased 495 feet frontage on the Gowanus canal for the establishment of a shipyard. The purchasers now have a large shipyard at the foot of Twentieth street, Brooklyn, N. Y.

BROOKLYN, N. Y.—The Hauck Mfg. Co. has purchased property on the south side of Tenth street, near Second avenue, and contemplates the immediate erection of a factory building.

BUFFALO.—Plans have been drawn for a $20,000 factory for the Standard Mirror Co. It will be one story, 82 x 119 feet.

BUFFALO.—The South Buffalo Terminals Co. is said to be preparing plans for a 1-story factory, 60 x 96 feet, to cost $28,000.

COXSAKIE, N. Y.—Bids will be received shortly by this village for the construction of a $37,000 filtration plant.

DUNKIRK, N. Y.—The United States Radiator Co. contemplates erecting an addition to its storehouse.

HALL, N. Y.—The plant of Libbey, McNiell & Libbey will be remodeled at a cost of $200,000.

LONG ISLAND CITY, L. I., N. Y.—Bids were received April 4 by Bollinder & Perrot, 1328 Broadway, New York city, for the construction of a $350,000 plant for S. Karpen & Bros., Brooklyn. The proposed building will be 6 stories high, 80 x 488 feet.

NEW YORK.—Levering & Garrigues have the general contract to build 1 and 2-story concrete factory buildings for the Pittsburgh Plate & Glass Co. in Long Island City. The buildings are estimated to cost $200,000.

NEW YORK.—Frank E. Allen, 607 West Forty-third street, representing the New York Manufacturers Co., has awarded the general contract to H. H. Vought Co., Grand Central Terminal building, for the construction of a 4-story, 100 x 120-foot warehouse.

ONEONTA, N. Y. — The Kayser Mills, Windsor avenue, will build a large addition to its plant.

ROCHESTER, N. Y.—The Wollensak Optical Co., 1415 Clinton avenue, let a contract to A. Friedericks & Son, 712 Lake avenue, for a 4-story factory 100 x 75 feet, $100,000.

ROCHESTER, N. Y.—The board of contract and supply has arranged to build a power house here costing $20,000.

SOUTH SCHENECTADY, N. Y. — The general contract for a $1,000,000 government warehouse in this city has been awarded to Feeney & Sheehan, Albany, N. Y.

BLOOMFIELD, PA.—Hoffman & McClure of this city have bought the planing mill of Fiessler brothers and will refit it for a bending works.

CONNELLSVILLE, PA.—The Stahl Plumbing Co. will rebuild its plant here soon.

CORRY, PA.—The Howard Tanning Co., East Main street, has plans for a 2-story addition 71 x 276 feet to its factory, to cost $50,000. W. J. Howard is general manager.

CORRY, PA.—J. W. and A. P. Howard Co. will build another tannery here in the near future.

ELK LICK, PA.—The Birdsboro Steel Foundry & Machine Co. has let the contract for an addition to its foundry, 135 x 40 feet.

INDIANA, PA.—The Consolidated Lumber & Supply Co. will build three tile and con-

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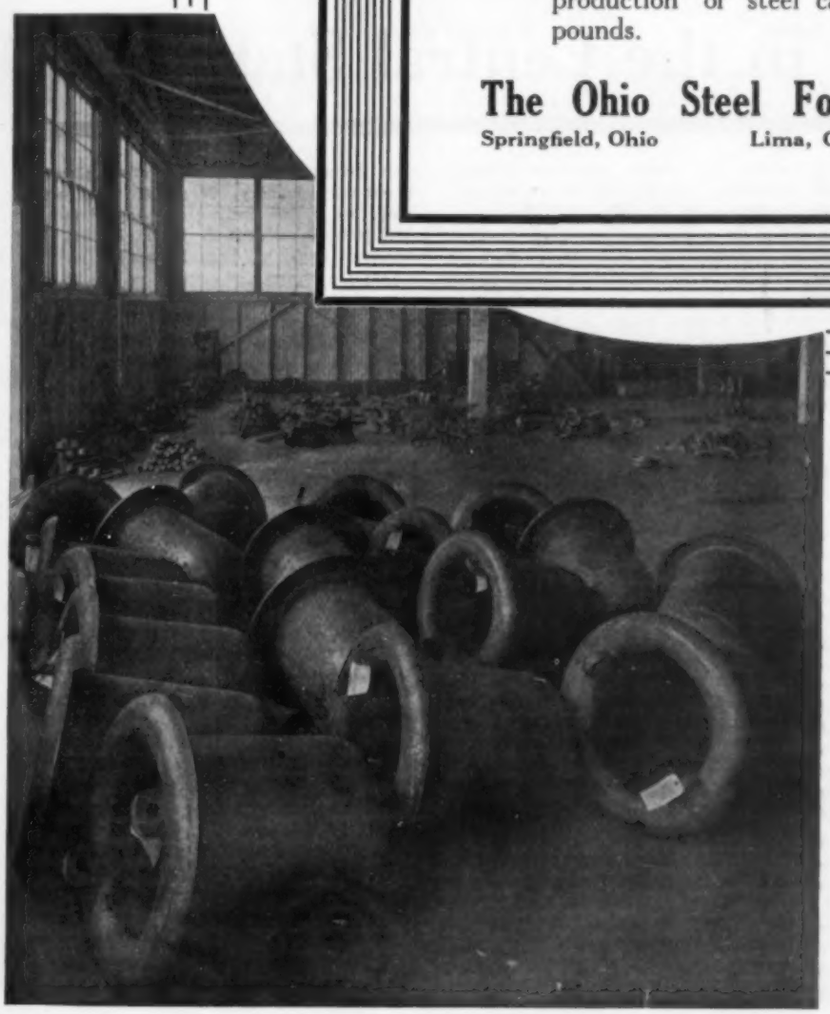


Quality PLUS Service

crete factory buildings, each 60 x 150 feet, to manufacture mine cars. It will also build a planing mill and garage.

KENNETT SQUARE, PA.—The Fibre Specialty Co. will build a plant 60 x 160 feet.

MIDDLETOWN, PA. — The government will rush work upon depot buildings here.

MOUNT UNION, PA. — The Gray Iron Castings Co. will fit up a plant on East Donegal street.

PARKERSBURG, PA. — The Parkersburg Iron Co. has let a contract to the Rust Engineering Co., Penn building, Philadelphia, for a $35,000 boiler house.

PHILADELPHIA. — Charles Lenning & Co. have awarded the contract for an $11,000 machine shop to Charles Harbinson.

PHILADELPHIA.—An $8000, 1-story, 40 x 68-foot repair shop will be constructed by the Gulf Refining Co.

PITTSBURGH.—The Keystone Bronze Co. let a contract to the Lawrence Steel Products Co. for an addition 86 x 148 feet to its foundry on Thirty-ninth street.

PHILADELPHIA.—The Philadelphia Roll & Machine Co. has awarded the Belmont Iron Works a $15,000 contract for crane runways.

SCRANTON, PA.—The Sall Mountain Asbestos Co. has purchased land and will enlarge its plant by an addition costing $15,000.

SHARON, PA. — The Sharon Water Co. will add an 8,000,000-gallon water pump and other improvements to its plant.

ST. CLAIR, PA.—The Bob & Baskind Co. has let a contract for an addition to its factory.

WAYNESBORO, PA.—The E. B. Co. will build another addition, 75 x 115 feet, to its plant on Second street and will let the contract to A. R. Warner of this city.

WEST CHESTER, PA.—Officials of the West Chester and Philadelphia Traction Co. are laying out plans for the new freight and passenger station to be erected at the corner of Gay and Walnut streets.

CAMDEN, N. J.—Erwin & Leighton, Philadelphia, have received the general contract for the construction of a $60,000 addition to the plant of the Howard Croft Sons Co.

EAST ORANGE, N. J. — Massey-Harris Harvester Co., Inc., has been incorporated with $3,000,000 capital to manufacture and deal in agricultural implements. The incorporators are J. N. Shenstone, Thomas Findley and Charles L. Wisner, all of East Orange.

ELIZABETHPORT, N. J. — The Singer Mfg. Co. has awarded to the Austin Co., Philadelphia, a contract for the construction of a $300,000 plant addition. The new building will be 1-story high, 200 x 600 feet.

MORRISTOWN, N. J.—Augustus H. Bartley has sold his interest in William Bartley & Sons, Inc., of Bartley, to the Richardson Scale Co. The latter company will use the Bartley foundry and also continue the general foundry work.

NEWARK, N. J.—Hurley & Johnson have contracted with Harvey Johnson for a 1-story forge factory on Thomas street, 50 x 50 feet in size, to cost $3000.

NEWARK, N. J.—American Can Co., 312 Elizabeth avenue, will erect 1-story steel and concrete factory to cost $13,800.

NEWARK, N. J.—B. F. Sturtevant Co. has been incorporated with $3,700,000 capital to manufacture machinery. Eugene N. Foss, E. B. Freeman and William V. Kellam, all of Boston, are the incorporators.

PATTERSON, N. J.—The American Locomotive Works, East Jersey Pipe Corp. and the Passaic Steel Co. have asked the city authorities to erect several hundred dwelling houses for their employes.

RAHWAY, N. J.—The Pneumatic Tool Supply Co. has awarded the contract for the construction of a one and two-story, 200 x 300-foot machine shop and factory building to John N. Gill & Co., Philadelphia.

WILMINGTON, DEL.—Bids will be received about April 15 by Architect R. C. Tindle on a 3-story, 90 x 135-foot warehouse. The name of the owner is being withheld.

BALTIMORE.—The plant of the Kennedy Foundry Co. recently suffered $200,000 damage by fire. A number of valuable patterns were destroyed.

OELLA, MD.—A $500,000 cotton mill will be erected here by the Oella Cotton Mills Co. William Dickey & Sons, Ellicott City, Md., are representing the company. The general contract will be let on percentage basis without competition.

Activities in the Central States

BEAVER DAM, WIS.—The J. S. Rowell Mfg. Co. has sold its plant to E. Herzberg and O. E. Klatt who will establish a machine shop.

BLACK CREEK, WIS. — August Brandt, automobile and implement dealer, is about to award contracts for the erection and equipment of a public garage, warehouse and service shop building, costing about $18,000.

FOND DU LAC, WIS. — The Boggess Mfg. Co., maker of mop wringers and similar specialties, has opened its new plant in the Haas building, Second and Macy streets. A complete galvanizing plant will be installed during the summer and estimates are now being received. J. J. Carberry is secretary and treasurer.

GREEN BAY, WIS.—D. G. Meyer, owner of the Reo Garage, 132 South Adams street, will build a fireproof addition, 25 x 100 feet, for machine shop purposes. P. T. Benton is architect.

MADISON, WIS.—The Madison-Kipp Lubricator Co., manufacturing oiling units and systems for lathes and other tools, tractors, gas engines, etc., will add a full second story to the machine shop erected during the summer and fall of 1917 to provide much-needed facilities for light machine operations and assembling. A second story also will be added to the office building. The work will cost about $35,000 and is being done under contract by George C. Crane & Son, Madison.

MADISON, WIS.—A loss of $15,000 was caused by fire in the emergency machine shop, boiler house and roundhouse of the Chicago & North-Western Railroad Co. in West Madison. The blaze originated in the machine shop, which was totally destroyed together with equipment. It will be rebuilt at once.

MILWAUKEE. — At the spring election on April 2 the voters adopted bond issues as follows: For rebuilding Sixteenth street viaduct, $200,000; for a new bascule bridge over Milwaukee river at State street, $250,000; for a new bridge at North avenue, $200,000; for a new central police station, $250,000. Plans for practically all of the work have been completed under the direction of Percy Braman, commissioner of public works. Bids probably will be taken at various times during the early summer.

MILWAUKEE. — Articles of incorporation have been filed by the Jonas Lalley Light Co., Milwaukee. The capital stock is $25,000 and the incorporators are August A. Jonas, Gustav Jonas and John P. Peterson. The company will manufacture, deal in and install electric light plants for farms and similarly isolated purposes.

MILWAUKEE. — The Interstate Iron & Steel Co., First National Bank building, Chicago, has been awarded the contract for furnishing all reinforcing bars and similar material, amounting to 810 tons, required for the new $250,000 elevator and warehouse to be erected at Oregon and Hanover streets, Milwaukee, by the L. Teweles Seed Co., 113 Clybourn street.

MILWAUKEE.—Reports that the Pelton Steel Co. is intending to erect a large addition to its foundry are explained as premature by T. H. Harvey, general manager of the company. Mr. Harvey said that the company merely is getting estimates on several new buildings and equipment and will make a decision on the basis of these figures when they become available. Tentative plans for a one-story foundry, 84 x 160 feet, with a wing, 65 x 85 feet, are being drawn by Architects Schuchardt & Judell, 508-510 First National Bank building, Milwaukee.

MILWAUKEE.—The Hercules Steel Castings Co. will build a 1-story steel foundry, 80 x 300 feet, costing $100,000. E. B. Generich, 1102 Wells building, is secretary.

NEENAH, WIS.—The Bruce Boiler Works has bought the plant of the Pomeroy Mills Co. and will equip it for boiler, structural and ornamental iron work.

RACINE, WIS.—The Hamilton-Beach Mfg. Co. will let a contract soon for a warehouse and factory addition costing $80,000. The A. L. Flegel Co. is the architect.

WEST ALLIS, WIS.—The Allis Chalmers Mfg. Co., Otto Falk, president, will build a foundry, 150 x 200 feet, costing $30,000.

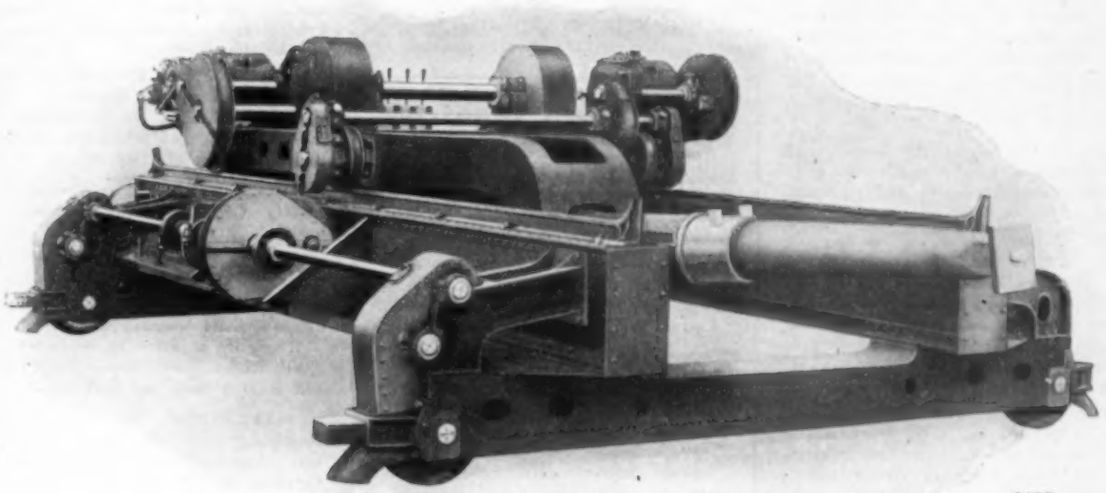
ADRIAN, MICH. — The Adrian Knitting Co. is building an addition to its Michigan avenue plant 60 x 130 feet. Work is now underway.

ANN ARBOR, MICH.—An election will be held soon on issuing $200,000 in bonds for a pumping station and water mains. M. Osgood is city engineer.

ANN ARBOR, MICH.—The Forge Products Corp., capitalized at $150,000, has been chartered under the New York laws to manufacture high speed steel forgings and gasoline engine valves. L. J. Hoover is president.

DETROIT.—The C. Kline Forge Co., St. Aubin avenue, will build a 1-story forge shop to cost $25,000.

DETROIT.—Fire has severely damaged the warehouse on the Armstrong & Graham lea-



Low Type Charger Designed and Built for Republic Iron and Steel Co., Youngstown, Ohio

CHARGING MACHINES AND MANIPULATORS

A New W-S-M Bulletin

Of interest to users of charging and manipulating equipment is our new Bulletin A-7. It describes our various standard type Open Hearth chargers, also special machines for charging Heating Furnaces, for handling slabs, ingots, blooms, billets, wheels, tires, etc. We are prepared to build a special machine for your particular requirements.

Write for Bulletin A-7

The Wellman-Seaver-Morgan Co.

Cleveland, Ohio, U. S. A.

Say you saw it in THE IRON TRADE REVIEW

ther firm. Loss amounted to $300,000. Members of the firm are Edwin E. and Henry I. Armstrong and Burk M. Graham.

STURGIS, MICH.—The Berridge Shear Co. will build a 1-story forge shop 20 x 30 feet.

CHARLESTON, ILL.—A bond issue of $20,000 is planned to provide for improvements to the waterworks and electric light plants. T. T. Schumaker is superintendent.

CHICAGO.—The Chicago Shipbuilding Co. is building a 2-story addition, 20 x 65 feet, to cost $25,000.

CHICAGO.—J. L. Sparks, 320 West Grand avenue, is building a 1-story foundry 50 x 75 feet at 1723 Carroll avenue, to cost $10,000.

CHICAGO. — The Garden City Spring Works, 2300 Archer avenue, is building an addition to cost $60,000. Frank D. Chase, 122 South Michigan avenue, is architect.

CHICAGO.—Frank I. Bennett, commissioner of public works, is asking an appropriation of $4,855,000 for the construction of bridges Madison street, Twelfth street, Kimball avenue, Wells street and Franklin-Orleans streets.

CHICAGO.—The Chicago Galvanizing Co., capitalized at $10,000 has been chartered by Frank W. Black, W. T. Jones and Charles B. Cone, 332 South Michigan avenue.

CHICAGO.—The Joslyn Mfg. & Supply Co., M. L. Joslyn, president, 133 West Washington street, is building additions 90 x 90 feet, and 90 x 180 feet, at Thirty-seventh and Morgan streets.

MADISON, ILL.—The Tri-City Steel Co., manufacturer of railroad equipment, S. E. Camp, president, 20-21 Railway Exchange building, St. Louis, will build a steel rolling mill, 100 x 390 feet, to cost $100,000.

ST. CHARLES, ILL.—The Faultless Iron Works will rebuild its burned plant. H. Janes is manager.

ANDERSON, IND.—The Hill Pump Co. will build a plant 100 x 200 feet at Twenty-over the Chicago river including structures at third and St. Charles streets.

EAST CHICAGO, IND. — The Hubbard Steel Co. is building a steel foundry 200 x 600 feet.

EAST GARY, IND.—The Gary Foundry & Machine Co. is building an addition 24 x 86 feet to its foundry and two pattern storage buildings. W. H. Kleppinger is president.

INDIANAPOLIS.—The Patrick Lock Co., capitalized at $20,000, has been chartered to manufacture locks and machinery by T. F., F. M. and L. Patrick.

INDIANAPOLIS. — The Clarence Angster Mfg. Co., capitalized at $20,000, has been chartered to manufacture machinery by Frank W., Clarence and Carl Angster.

MICHIGAN CITY, IND.—The Joseph W. Hays Corp., capitalized at $275,000, has been chartered to manufacture machinery by Frank R. Warren, Floyd A. Deale, and B. A. Tuttle.

CINCINNATI.—Incorporation papers have been filed for a new coal company. E. W. Tildesly, vice president of the Tildesly Coal Co. is one of the incorporators. The company will be located at 2311 Union Central building.

Government Inquiries

Bids on the following equipment are desired by the navy department, bureau of supplies and accounts, Washington:

Power press, die sinking machine, turret machine and lathes, 3937½, May 3, Newport.

Lathes, 3947½, May 29, Washington.

One 200-ton overhead traveling crane, 4001½, May 3, Washington.

Drilling machine, 4016½, April 22, Washington.

Two drilling machines, 4022½, April 22, Washington.

Twenty motor driven lathes, 4023½, Washington.

Twenty electric driven winches, 4027½, Brooklyn.

Three grinding machines, 4031½, April 22, Washington.

Three milling machines, 4036½, April 22, Washington.

Two engine lathes, pipe threading machine, 4037½, Mare Island.

Thirty-five milling machine, 4052½, May 3, Washington.

Four electric centrifugal machines, 4098½, May 3, Washington.

The schedule numbers, dates of opening and places of delivery follow the specifications of the tools.

MANNINGTON, KY.—The Memphis Coal & Mining Co., Memphis, Tenn., will build a $40,000 steel tipple here.

NORTONVILLE, KY.—The Norton Coal Mining Co. has let a contract to the Ruby Lumber Co., Jadisonville, Ky., for an addition to its power house and supply house, from plans by Architect Ben Price, 518 Empire building.

PRINCETON, KY.—National Oil & Refining Co. is in the market for steam pipe and oil well casing. The company has drilling machinery, and is starting operations on a 6000 acre tract of land.

WINCHESTER, KY.—Winchester Lumber & Mfg. Co. will rebuild its burned plant in the fall. It has been forced to hold up plans due to inability to obtain machinery and other equipment.

WHITESBURG, KY.—Tug River Lumber Co. will build tramway and install band mill with a daily capacity 30,000 feet of lumber.

BECKLEY, W. VA.—Cooper & Walker will build a flour and feed mill at this place.

CHARLESTON, W. VA. — The Boone Producing Co., capitalized at $25,000, has been chartered to operate for oil and gas in Sherman district, Lincoln county, by D. C. Smallridge, O. J. Anderson, Montgomery; George N. Hancock, H. H. Smallridge, Harold P. Tompkins, Charleston.

HUNTINGTON, W. VA.—The Peter Cave Coal Co., capitalized at $50,000, has been chartered to operate in coal, timber, oil and gas at Alkol, Lincoln county, by I. J. Harshbarger, J. Bruch, D. J. Pancake, L. J. Corbly, Huntington..

HUNTINGTON, W. VA.—The Huntington Lumber & Supply Co. will build an addition to its plant here soon.

MORGANTOWN, W. VA. — The Cheat Canyon Coal Co., capitalized at $10,000, was chartered to operate mines in Monongalia county, by Angeline Pollock, Robert H. Pollock Jr., Harold B. Pollock, William G. Frankenburger, Lida F. Frankenburger and John A. Purinton, Morgantown.

PARKERSBURG, W. VA.—W. Schneider has a contract for rebuilding a silk mill.

SISTERVILLE, W. VA.—The Price Construction Co. has a contract for shops for the Western Maryland railroad at Hagerstown, Md., to be 35 x 80 feet.

New Business in Eastern Canada

NEW WESTMINSTER, B. C.—The Fraser River Shipbuilding Co. has been formed to engage in the construction of wooden, steel and concrete ships, etc. The company has secured a site on the Fraser river, within the city limits and will commence at once of the erection of a plant.

VANCOUVER, B. C.—The British American Shipbuilding Co. has made arrangements with the harbor board for a site on the Kitsilano reserve, where it will construct a shipbuilding plant.

VANCOUVER, B. C.—The Western Canada Shipyards, Ltd., proposes to build a new plant on False creek.

VANCOUVER, B. C.—The Wallace Shipyards, Ltd., are making considerable extensions to their plant. Three or four new buildings will be erected and the machine shop will be enlarged for the building of engines, boilers, and other machinery.

VANCOUVER, B. C.—The Rubber Roofing Co., Ltd., which has a plant at Sydney, B. C., proposes to establish a plant in Vancouver, to cost $125,000.

VICTORIA, B. C. — The Victoria Shipbuilding Co., Ltd., will make considerable extensions to its plant and install new equipment.

JARVIS, ONT.—J. J. Parsons, is in the market for an 8 or 10-horsepower gasoline engine.

OTTAWA, ONT.—The construction of a plant for rolling steel plates, angles, etc., the output of which will be sufficient to meet the needs of the shipyards of the dominion for some years to come, will be started immediately at Sydney, B. C., as the result of an arrangement completed between C. C. Ballantyne, minister of marines and fisheries and the Dominion Iron & Steel Corp. A plant will be erected capable of turning out 150,000 tons of ship steel annually. The plant will entail an expenditure by the Dominion Iron & Steel Corp., of from $3,000,000 to $5,000,000 and will be ready for operation in from 15 to 18 months.

TORONTO, ONT.—John Price, Ltd., has been incorporated to manufacture brick, tile, terra cotta, sewer pipe, etc.; $200,000 capital stock, by George P. Price, 94 Greenwood avenue; Charles H. Price, John Price and others, all of Toronto.

TORONTO, ONT. — The Auto Electric Service Co., Ltd., has been incorporated to

manufacture electrical equipment, machinery, motors, storage batteries, etc., with $40,000 capital stock, by George J. Beattie, 72 Victoria street; Ivan R. Church, Rudolph P. Caulford and others all of Toronto.

TORONTO, ONT.—The Pioneer Collapsible Tubes, Ltd., has been incorporated to manufacture collapsible tubes, metal tubes, etc.; $50,000 capital stock. Provisional incorporators are Alfred T. Bonathan, 108 Ashburnham road; Charles W. Toms, Henry L. Crossland and others, all of Toronto.

TORONTO, ONT. — George B. Meadows Co., Ltd., is in the market for a press for sheet metal work.

TORONTO, ONT.—The plant of the Thor Iron Works, foot of Bathurst street, which is engaged in the building of steel ships for Canadian registry, was destroyed by fire, April 2, with a loss of $300,000. The loss to machinery is estimated at $100,000, which will have to be replaced immediately. The company will commence the rebuilding of its plant at once.

TORONTO, ONT. — The manufacturing plant of the Jefferson Glass Co., Ltd., 388 Carlaw avenue, was destroyed by fire April 1, with a loss of $60,000, of which $30,000 was to machinery. The company will rebuild and will require new machinery and equipment. W. A. Martin is general manager.

TORONTO, ONT. — A. H. Aunger, 759 Pape avenue, is in the market for 5 and 20-horsepower motors.

TRENTON, ONT.—The Trenton Cooperage Mills, Ltd., has been incorporated to manufacture boxes, all kinds of woodwork, etc.; $100,000 capital stock; Joseph M. Bullen, 44 King street west, Harold L. Steele, Wendell Osborne and others, all of Toronto, Ont. are the provisional directors.

MONTREAL, QUE.—The Dominion Lamp Co., Ltd., has been incorporated to manufacture electric lamps, machinery, electrical equipment, etc.; $100,000 capital stock; by Philip H. Klein, Westmount, Que.; Henry B Irving, Edson G. Place and others of Montreal.

MONTREAL, QUE. — The Interocean Transportation Co., Ltd., has been incorporated to build and operate ships, tugs, shipbuilding plants, drydocks, etc.; $1,000,000 capital stock; by Waldo W. Skinner, George G. Hyde, Ronald C. Grant and others, all of Montreal.

WINNIPEG, MAN.—The Great West Electric Co., Ltd., has been incorporated to build and operate electric light, heat and power plants, to manufacture machinery, electrical equipment, etc.; $300,000 capital stock; by Sidney T. Smith, William R. Ingram, James N. Hutchison and others, all of Winnipeg.

New Trade Publications

CONTRACTORS' SUPPLIES.—A bulletin issued by the Walter A. Zelnicker Supply Co., St. Louis, describes the company's line of contractors' supplies which include rails, both new and relaying, locomotives, tanks, cars, steel piling, compressors, wire rope, boilers and pipe.

PIPE TOOLS.—Pipe tools are described in an attractive booklet recently issued by the Greenfield Tap & Die Corp., Greenfield, Mass. The book contains 72 pages and is well illustrated. Aside from describing the company's line of pipe tools, the booklet contains a short historical sketch of the company and many tables of useful information.

MARINE BOILERS. — The Badenhausen Co., Philadelphia, has issued a booklet describing its continuous circulation marine boiler. The subject of water circulation in boilers is interestingly explained in the booklet, with the aid of illustrations. The booklet will interest engineers and others who have to deal with boilers.

COMMUNITY HOMES. — An attractive and artistic 30-page booklet issued by the Hydraulic Pressed Steel Co., Cleveland, contains valuable information regarding the erection of reinforced concrete houses for industrial workers and others. The booklet is profusely illustrated and includes many plans of standard houses.

LADLES.—The Whiting Foundry Equipment Co., Harvey, Ill., has issued a 24-page folder describing its line of ladles which includes crane, truck, bottom tap, teapot spout, shank and hand, car wheel, reservoir and trolley types. The booklet is illustrated and comprehensive descriptions of each article are included.

PIPE TOOLS.—Catalog 38 devoted to pipe tools is being distributed by the Greenfield Tap & Die Corp., Greenfield, Mass. The bulletin illustrates, describes and presents complete specifications for pipe threaders, die stocks, pipe dies, stocks and dies for brass tubing, pump makers' stocks, plumbers screw plates, taps and reamers, tap wrenches, pipe wrenches, pipe cutters, and many other tools.

MAGNESIA.—The Magnesia Association of America, Philadelphia, has recently issued an attractive 32-page booklet describing the educational publicity given its insulation material. The booklet reproduces advertisements that appeared in many technical papers during 1917. It is an interesting collection and will appeal to engineers and others who have occasion to consider insulating material.

BOLTS, NUTS, RIVETS. — An unusually attractive catalog, 120 pages long, with an index on the margin, to enable the reader to reach that part of the volume which he desires in a few moments, was recently published by the Kirk-Latty Mfg. Co., Cleveland. Size and price tables are conveniently arranged, the lengths of the bolts being placed in the first column and the prices opposite under separated diameter headings.

TIN ROOFING.—An 11-page folder issued by the N. & G. Taylor Co., Philadelphia, gives descriptions, details and other data recommended by the American Institute of Architects regarding tin roofing. These include standard specifications for tin roofs and tin roofing work, data on how a tin roof should be laid, color suggestions for tin roofing, information for architects and some tin roof "don'ts". The folder is illustrated.

MECHANICAL GAS PRODUCER. — An 8-page illustrated folder issued by the Wellman-Seaver-Morgan Co., Cleveland, contains full details of the company's mechanical gas producer. The illustrations clearly show the construction details of the device and the reading matter describes the principle and operation. Among the chief features described are a mechanical water-cooled poker and mechanical feeds.

PLANERS.—"The History of the Planer" is the title of a 32-page booklet recently issued by the Cincinnati Planer Co., Cincinnati. This interesting bulletin traces the development of the planer over the last century and illustrates some of the crude relics which mark the early practice. The material in the bulletin is prepared so as to illustrate most strikingly the difference in design of the two periods. The modern units are illustrated on the right hand page and their early prototypes are shown on the facing page.

POWER SHEARS. — A catalog describing and illustrating power shears, entitled "Gold for the Scrapheap," has been published by the Cedar Rapids Foundry & Machine Co., Cedar Rapids, Iowa. The machines are built is several sizes, the smallest being designed for country and small town scrap iron dealers. In the largest size the teeth of the bull gear are shrouded, giving them additional strength and preventing breakage. The small pinion which runs into the bull gear is of cast steel. The shear has a guide post on each side of the jaw, which is bolted together at the top to reinforce the jaw and to give it greater rigidity.

BRASS FOUNDRY SUPPLIES. — "Suggestions for Brass Foundrymen" is the title of a 96-page catalog being distributed by Frederic B. Stevens, Detroit, devoted to a complete listing of equipment and supplies used in brass foundry operations manufactured by that company. Natural draft furnaces are described in the first part of the booklet, this portion being followed by descriptions of blowers, crucible shanks, tongs, crucibles, etc. Other portions of the booklet describe and illustrate sand sifters, riddles, core making machines, core ovens, core wire straighteners, snap flasks, cast iron flasks, clamps, air and electric vibrators, tumbling barrels, sprue cutters and magnetic separators. Several pages of foundry notes and formulas also are included.

COUNTERSHAFTS.—An 8-page bulletin devoted to friction clutch type countershafts was recently published by the Foster Machine Co., Elkhart, Ind. This countershaft is of the expanding friction ring tye. The loose pulleys are equipped with roller bearings. The more prominent single features of the countershaft are said to be the gripping power and ease of expanding the friction clutch ring. To effect this operation two radially mounted fingers are pivoted to swing around a tapered stud and are provided with ears engaging the slots cut in the expansion rings. The inner ends of these fingers engage and are spread apart by the wedge-shaped part of the dog, which is pivoted on a pin mounted in the driver and is operated by a wedge mounted on the shaft. The wedge is operated longitudinally by a fork, shipper rod and lever, in the manner common with the average countershaft. The dog is counter-balanced to counteract the action of centrifugal force at high speed. The buletin is profusely illustrated, shows the action and part taken by each separate part of the complete countershaft and presents diagrammatic views to facilitate the reader to grasp the important details of the mechanism.

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports	
Old range Bessemer, 55 iron	$5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05

WAREHOUSE PRICES

Steel bars, Chicago	4.10c
Steel bars, Cleveland	4.035c
Steel bars, Detroit	4.085c
Steel bars, Philadelphia	4.10c
Steel bars, New York	4.095c
Steel bars, St. Louis	4.17c
Steel bars, Cincinnati	4.085c
Steel bars, St. Paul	4.22c
Steel bars, Buffalo	4.05c
Iron bars, Buffalo	4.65c
Iron bars, Chicago	4.10c
Iron bars, Cleveland	3.985c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.17c
Iron bars, Cincinnati	4.085c
Iron bars, Philadelphia	4.50c
Iron bars, New York	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis	4.27c
Shapes, St. Paul	4.32c
Shapes, New York	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis	4.52c
Plates, St. Paul	4.57c
Plates, New York	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, Cleve.	5.385c
No. 10 blue anl., Buffalo	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.435c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo.	6.45c
No. 28 black sheets, Cleve.	6.385c
No. 28 black sheets, Cinci.	5.45c
No. 28 black, Detroit	6.435c
No. 28 black sheets, St. L.	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo.	7.70c
No. 28 galv. sheets, Cleve.	7.635c
No. 28 galv. sheets, Cinci.	6.635c
No. 28 galvanized, Detroit	7.685c
No. 28 galv. sheets, St. L.	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

(Prices in Gross Tons)

STEEL WORKS USE

Bundled sheets, Cincinnati	$22.50 to 23.00
Bundled sheets, Pittsburgh	$22.00
Bundled sheets, Cleveland	23.50 to 24.25
Bundled sheets, Buffalo	24.00 to 25.00
Boiler plate, cut, No. 1 Chgo.	24.50 to 25.50
Boiler plate, cut No. 1, St. L.	25.50 to 26.00
Frogs, switches, guards, St. L.	28.50 to 29.00
Frogs, switches, guards, Chgo.	29.00
Heavy melting steel, Pitts.	29.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo.	28.00 to 29.00
Heavy melt'g steel, Cleveland	29.00
Heavy melting steel, Cinci.	26.50 to 27.00
Heavy melt'g steel, east. Pa.	28.00 to 29.00
Heavy melting steel, N. Y.	26.75
Heavy melting steel, St. L.	27.50 to 28.00
Heavy melting steel, Birming.	23.00 to 25.00
Hydraulic press. sheets, Cleve.	28.50 to 29.00
Hydraulic press. sheets, Pitts.	26.00
Hydraulic press. sheets, Chgo.	26.00 to 26.50
Knuckles, couplers, Chgo.	34.00
Knuckles, coup. St. Louis	33.75 to 34.00
Low phos. steel, Buffalo	37.50
Low phos. steel, Pittsburgh	39.00
Low phos. steel, eastern Pa.	39.00
Shoveling steel, Chicago	28.00 to 28.50
Shoveling steel, St. Louis	26.50 to 27.00
Springs, Chgo.	34.00
Steel rails, short, Chicago	34.00
Steel rails, short, Cleveland	34.00
Steel rails, short, St. Louis	33.75 to 34.00
Steel rails, old, Birmingham	27.50 to 30.00
Stove plate, Chgo.	**25.50 to 26.50**
Stove plate, Cincinnati	**20.00 to 20.50**
Stove plate, St. Louis	22.50 to 23.00
Stove plate, N. J. points	23.75
Stove plate, Birmingham	20.00 to 22.00
Stove plate, Buffalo	25.00 to 26.00
Stove plate, eastern Pa.	23.00 to 24.00
Stove plate, Cleveland	25.00 to 25.50
Stove plate, Pittsburgh	22.00
Bundled sheets, Cincinnati	20.00 to 20.50

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:	
Cleveland	$0.95
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54
Buffalo to:	
Albany, N. Y.	$1.26
New England (rail)	3.10
New York and Brooklyn (rail)	3.10
Virginia furnaces to:	
Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark	3.52
Birmingham, Ala., to:	
Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	6.00
Philadelphia (r. and w.)	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40
Chicago to:	
Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul	2.00
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul	4.54
Duluth, Minn., to:	
Minneapolis-St. Paul	$1.25
Mayville, Wis.:	
Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:	
New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	16.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	17.0 cents
Chicago	21.5 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	82.5 cents
St. Louis	27.0 cents
New Orleans	30.0 cents
Birmingham	45.0 cents
Pacific coast (all rail)	$1.00
Pacific coast (tin plate)	1.00

IRON MILL USE

Angle bars, iron, Chgo.	38.50 to 39.00
Angle bars, steel, St. Louis	35.00 to 35.50
Arch bars, transoms, Chgo.	43.00 to 44.00
Arch bars and transoms, St. Louis	45.00 to 45.50
Busheling, No. 1, Cleveland	31.00
Busheling, No. 1, Buffalo	29.00 to 30.00
Busheling, No. 2, Buffalo	21.00 to 23.00
Busheling, No. 1, Pittsburgh	32.00
Busheling, No. 1, Cincinnati	25.00 to 25.50
Busheling, No. 1, Chgo.	28.00 to 28.50
Busheling, No. 2, Chgo.	18.75 to 19.75
Busheling, No. 1, St. Louis	27.00 to 27.50
Cast borings, New York	16.50 to 16.75
Cast borings, eastern Pa.	19.00
Cast borings, Cleveland	19.00
Cast borings, Buffalo	18.00 to 19.00
Cast borings, Cincinnati	15.50 to 16.00
Cast borings, Pittsburgh	19.00
Cast borings, Birmingham	12.00 to 13.00
Cast borings, Chgo.	18.00 to 18.50
Cast borings, St. Louis	17.00 to 18.00
City wrought, long, N. Y.	31.00
Cut forge, Chicago	31.00 to 32.00
Forge flashings, small, Cleve.	27.00 to 27.50
Forge flashings, large, Cleve.	27.00 to 27.50
Forge No. 1, eastern Pa.	26.50 to 27.50
Grate bars, Buffalo	24.00
Grate bars, Cleveland	25.50 to 26.00
Grate bars, N. J. points	23.75
Iron axles, Pittsburgh	46.50
Iron axles, Cincinnati	43.00 to 43.50
Iron axles, Cleveland	46.50
Iron axles, eastern Pa.	46.50
Iron axles, Chicago	46.50
Iron axles, St. Louis	46.00 to 46.50
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	38.00 to 39.00
Iron rails, Buffalo	36.00 to 37.00
Iron rails, Cincinnati	32.00 to 32.50
Iron rails, St. Louis	34.00 to 35.00
Iron rails, Cleveland	34.00
Machine turnings, Cincinnati	16.00 to 16.50
Machine turnings, Cleve.	19.00
Machine turnings, Buffalo	17.00 to 17.50
Machine turnings, N. Y.	15.50
Machine turnings, Pitts.	19.00
Machine turnings, east. Pa.	18.50 to 19.00
Machine turnings, Birming.	17.00 to 18.00
Machine turnings, Chicago	17.75 to 18.25
Machine shop turnings, St. L.	17.50 to 18.00
Pipes and flues, Cleveland	24.50 to 25.50
Pipes and flues, Chicago	26.25 to 26.75
Pipes and flues, St. Louis	27.50 to 28.00
R. R. mch. cast, No. 1, Buff.	34.00
R. R. wrgt. No. 1, Buffalo	34.00
R. R. wrgt., No. 1, east. Pa.	34.00
Railroad wrgt. No. 1 Cinci.	33.50 to 34.00
Railroad wrgt., No. 1, Cleve.	34.00
R. R. wrought, No. 1, Pitts.	34.00
Railroad wr'ght, No. 1, Chgo.	33.50 to 34.00
Railroad wr'ght, No. 2, Chgo.	32.00 to 33.00
R. R. wrgt. No. 1, Birming.	26.00 to 27.00
No. 1 yard wrought East Pa.	33.00
No. 1 busheling wrgt., E. Pa.	31.00
Sheet wrought, Pittsburgh	34.00
Railroad wrgt., No. 1, St. L.	32.00 to 33.00
Railroad wrgt., No. 2	30.50 to 31.00
Wrought pipe, Buffalo	27.00 to 28.00
Wrought pipe, eastern Pa.	31.50 to 32.00
Wrought pipe, ungraded, eastern Pa.	29.00

IRON OR STEEL WORKS USE

Axle turnings, Cleveland	$24.00
Axle turnings, Buffalo	24.00
Heavy axle turn'gs, E. Pa.	24.00
Heavy axle turnings, Pitts.	25.00
Shafting, New York	36.00
Shafting, eastern Pa.	39.00
Steel car axles, Pittsburgh	46.50
Steel car axles, Birmingham	31.00 to 32.00
Steel car axles, New York	43.00
Steel car axles, Buffalo	44.00 to 46.00
Steel car axles, Cleveland	44.00
Steel car axles, eastern Pa.	46.50
Steel car axles, Chgo.	46.50
Shafting, St. Louis	37.50 to 38.00
Steel car axles, St. Louis	46.00 to 46.50

IRON FOUNDRY USE

Car wheels, (iron), Pitts.	$29.00
Car wheels, (steel), Pitts.	34.00 to 35.00
Car wheels, eastern Pa.	29.00
Car wheels, Buffalo	29.00
Car wheels, Chicago	29.00
Car wheels, St. Louis	28.50 to 29.00
Car wheels, Birmingham	25.00 to 28.00
Car wheels, Cleveland	30.00
Tram car wheels, Birming.	21.00 to 24.00
Cast, No. 1 cupola east. Pa.	33.00
Cast, No. 1, Birmingham	23.00 to 25.00
Cast, No. 1, Cleveland	31.00 to 31.50
Cast No. 1, Cincinnati	29.00 to 29.50
Cast, 1, heavy, N. J. points	32.25 to 32.75
Cast, 1, machy., N. J. points	32 25 to 32.75
Cast, No. 1, Chicago	32.00 to 33.00
Cast, No. 1, Pittsburgh	34.00
Cast No. 1 St. Louis	27.50 to 28.00
Malleable, Cincinnati	30.00 to 34.00
Malleable, Cleveland	30.00 to 34.00
Malleable, Buffalo	29.00 to 34.00
Malleable, Pittsburgh	33.00 to 34.00
Malleable, east. Pa.	29.00
Malleable, cupola, East Pa.	32.00
Malleable railroad, Chgo.	32.00 to 33.00
Malleable, agricultural, Chgo.	30.50 to 31.00
Malleable railroad, St. Louis	28.00 to 28.50
Malleabel agricultural, St. L.	27.25 to 27.75
Cast, No. 1, Cincinnati	26.00 to 26.50

MISCELLANEOUS USES

Boiler punchings, Chgo.	35.50 to 36.50
Reroll. rails, 5 ft. & ov., Pitts.	34.00
Reroll. rails, 5 ft. & ov., Chgo.	34.00
Reroll. rails, 5 ft. & ov., E. Pa.	34.00
Reroll. rails, 5 ft. & ov., St. L.	34.00 to 35.00
Reroll. rails, 5 ft. or over, Cleve.	34.00
Rerolling rails, long, Birming.	**37.50 to 38.50**
Locomotive tires, Chgo.	43.00 to 44.00
Locomotive tires, St. Louis	37.50 to 38.00